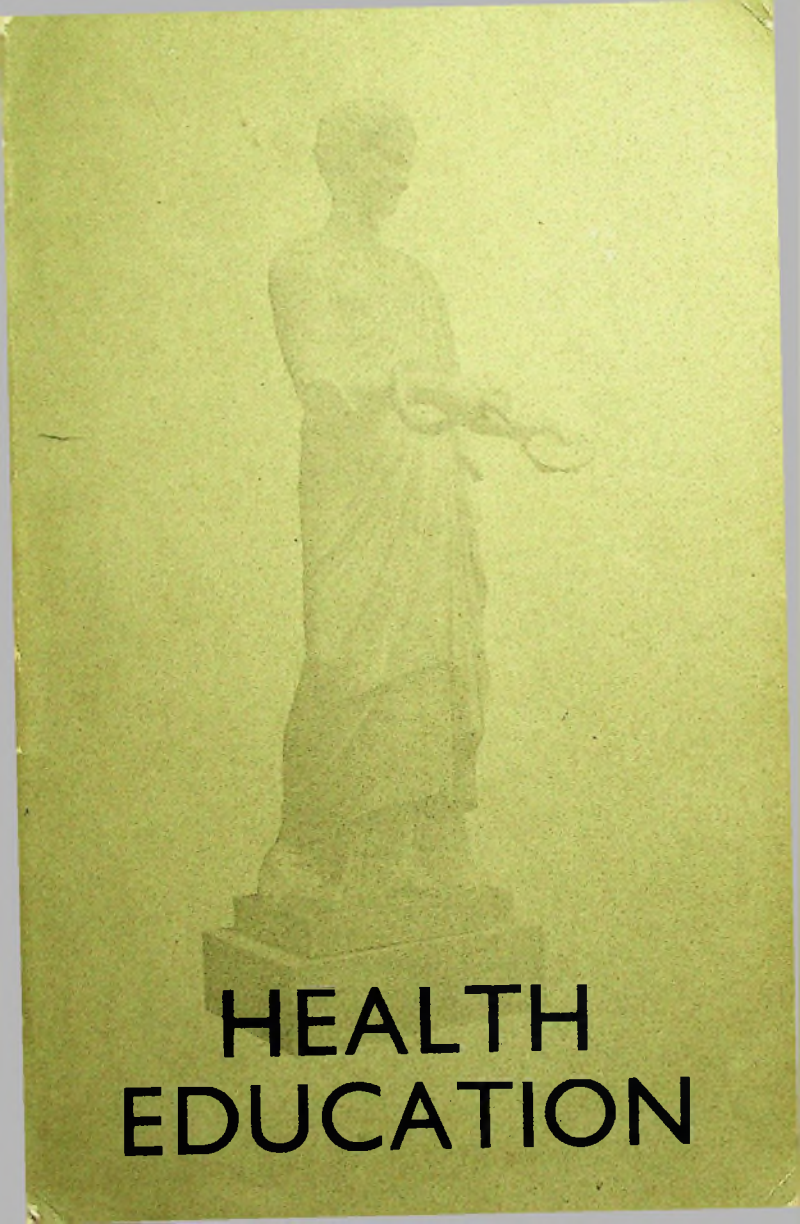

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MINISTRY OF EDUCATION

Suggestions on Health Education

for the consideration of teachers and others concerned in the health and education of school children

LONDON: HIS MAJESTY'S STATIONERY OFFICE

1940
(Reprinted 1951)

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HEALTH EDUCATION

PREFATORY NOTE

This revised Handbook of Suggestions on Health Education, like the original edition published in 1928 and the second edition published in 1933, is complementary to the Board's " Handbook of Suggestions for Teachers." A knowledge of its contents should therefore be regarded as part of the necessary equipment of every teacher. Like the Handbook it does not seek to prescribe for teachers any particular method or methods of teaching; its purpose is to put before them, for their information and use, a statement of the generally accepted principles of hygiene and to emphasise the need for securing the active co-operation of their pupils in the observance of these principles, both during school hours and in their home life.

M. G. HOLMES.

Board of Education,

31st July, 1939.

HEALTH EDUCATION

INTRODUCTION

Health Education and the Schools

During the present century and particularly during the last twenty years Health has come to occupy a prominent position among our national, civic, and personal, ideals. The increasing interest in Health Education shown by the teaching profession reflects, and indeed has materially helped to bring about, this general awakening to the paramount importance of the health of the body and with it that of the mind. As a result it is now universally recognised that provision for the practice and study of health should constitute an essential part of any organised system of public education.

Reasons for the present Issue

It is perhaps peculiarly opportune that the appearance of this edition should coincide with a period of intensified effort in reorganising schools, and with all the changes that are likely to follow from the raising of the school leaving age. At such a period teachers will inevitably be considering from a fresh angle many of their aims and methods and will even be entirely reconstructing their schemes of work in all subjects.

Moreover, since the last edition of this Handbook was issued further knowledge has been gained concerning the science of nutrition. It is the constant aim of the Board to note advances in knowledge and to determine how best they can be applied to promoting the health of the school child. In nutrition this aim has received practical application in various ways, of which the Milk in Schools Scheme and the increased provision of school meals are prominent examples.

In the present edition, the chapter which deals with the Hygiene of Food and Drink has been partly re-written in order to include these advances. Opportunity has also been taken to make a number of changes both in the order of the chapters and in the text, with a view to making the book more convenient for the use of teachers.

Purpose and Scope of this Handbook

This book is designed to be of service primarily to teachers who feel that the practice and study of health should be placed in their proper perspective in relation to school life as a whole. It regards health as something more than a mere " subject "

of the curriculum, and more than mere routine practice of healthy habits. It presents health as an ideal, the inculcation of which is no less important for national life than is that of those other ideals of character and conduct towards which the work of our schools is directed.

It is hoped that with the help of this book teachers will be enabled to plan programmes of Health Education which are so framed as to awaken the imagination of boys and girls and lead them to adopt healthy ways of living which will persist all through their lives. The more the practice and study of health becomes a constituent and vital part of the life of the school, the greater will be the eventual benefit to the community.

For the rest, the aim of the Board in issuing this Handbook cannot be more suitably expressed than in the following words which are quoted from the Introduction written by Sir George Newman for the last edition in July, 1933:—

> " The Handbook is to be regarded as a compendium which teachers will study and consider in planning progressive courses of training and instruction appropriate to the ages of the children for whom they are responsible. The information supplied is merely an outline of the kind of health knowledge which teachers will naturally fill in for themselves as the result of wider reading and experience. Once they have been moved by the inspiration of the story of man's unceasing endeavour to conquer disease, of which Chapter VIII (The Progress towards Health) gives but a glimpse, they will seek in their turn to kindle the minds of their pupils and to give them some understanding of the great adventure and exploration in which modern communities are engaged in their life-and-death struggle against powerful and often unseen foes, against ingrained personal habits, or the thraldom of social custom, convention and vested interests, that threaten even the existence of mankind. They will have little difficulty in thinking out for themselves ways of making health a matter of lively interest to their pupils; in devising methods for securing the regular daily practice of health habits on the part of older and younger children alike; and in selecting those aspects of health-knowledge which should form a vital part of school life.
>
> Finally, the teacher should lose no opportunity of securing the child's active co-operation in all matters of health at school. This can readily be effected where some form of the ' prefect system ' has been adopted; and, if proper regard be paid to the capacities of individual children, a considerable degree of responsibility can be delegated to elder boys and girls in connection with

practical hygiene and its application to school life. Within the school the teacher will embrace opportunities for health education in connection with the medical inspection of the child, the provision of lunch or the midday meal, the ordinary discipline and good ordering of the school, the training in domestic science, or the instruction in physical exercises and games. But the occasion is wider yet. For much may be done by the true teacher of hygiene in linking up the school with the home, in awakening the interest and responsibility of the parent, and in cultivating a larger health relation with the community as a whole. It is his privilege, in fact, to lay the foundations of a health-conscience in the minds of the English people of the next generation, and to teach the children to realise more fully the fundamental motives and means of healthy living, to understand the debt which one generation owes to another, and to cultivate a wider vision of what contributes towards ' the betterment of man's estate.' "

ARTHUR S. MACNALTY.

Board of Education,
July, 1939.

CHAPTER I

HEALTH EDUCATION AND THE SCHOOL CURRICULUM

1. The Place of Health Education in the Life of the School

If it is to play its proper part in school life Health Education must have accorded to it by teachers and pupils alike a position which is very different from that assigned to any of the traditional " subjects " of the school curriculum, each with its self-contained body of subject matter. These traditional subjects themselves are coming to be regarded as being a matter of activity* as much as of knowledge, and are tending to free themselves from the limitations imposed by set time-table periods and to form themselves into larger groups each having as its aim the promotion of the best development of the pupil in one direction or another. It would, therefore, be unwise and unnecessary to treat Health Education as if it were a limited body of knowledge to be dealt with theoretically in set periods occurring once or at most twice a week under the time-table heading of " Hygiene ".

It has been said that every teacher is a teacher of English, and perhaps something similar is true of Health Education. Certainly it may be suggested that in a well conducted school where the conditions are favourable and the teachers are enlightened and alert the children will be receiving a valuable training in Health Education. Cleanliness of person and surroundings, a reasonable regularity in the daily life of the

* *The Primary School.* (Report of the Consultative Committee of the Board of Education), p. 153:

"We desire to see the child an active agent in his early schooling, making his approach to the activities necessary for an understanding of the body of human civilisation and for an active participation in its processes through his own experiences and his own activities, and relating his growing knowledge at all points to the world in which he lives."

Cf., also the following passage from the same Report (on page 93): . . . " the curriculum is to be thought of in terms of activity and experience rather than of knowledge to be acquired and facts to be stored. Its aim should be to develop in a child the fundamental human powers and to awaken him to the fundamental interests of civilised life so far as these powers and interests lie within the compass of childhood, to encourage him to attain gradually to that control and orderly management of his energies, impulses and emotions, which is the essence of moral and intellectual discipline, to help him to discover the idea of duty and ensue it, and to open out his imagination and his sympathies in such a way that he may be prepared to understand and to follow in later years the highest examples of excellence in life and conduct."

school, early rising, fresh air, alternate periods of rest and activity, the daily supply of milk, and, where such things are provided, the wholesome and well-ordered meals of the school canteen*—all these play their natural and unconscious part in the promotion of health.

What a good school does for the physical health of its pupils it will do also for their mental health. Where they feel that they are doing things worth while reasonably well, and doing them according to their abilities well, where they are treated as individuals and have reasonable opportunities of expressing their ideas and feelings, and where they can take part in an adequate social life, we may be sure that the foundations are being laid of a wholesome life in the future.

But even if the school provides such an environment, it has not finished its task. Unless the child understands the meaning of what he does, he will not carry into his home life as much as he should of the experience he gains at school; nor will he be able to carry over enough of this experience into his life when school days are over, unless he has been given not only habits but also ideals, knowledge, and powerful sentiments. Further, it is necessary to protect a school as far as possible against epidemics and harmful influences from without which arise from lack of knowledge. Hence it follows that there should be some teaching of hygiene which will be of value exactly in proportion as the teachers realise the contribution it makes to the welfare of the children. Knowledge must be reinforced by practice, and practice must provide the basis of knowledge.

On the theoretical side Health Education has this peculiar characteristic which distinguishes it from all other branches of the curriculum, that not only is the subject of vital and personal interest to the learner, but much of the subject matter is to be found in his own body.

It is now more commonly realised that the primary aim of Health Education is to bring the pupil to understand and to control his own mind and body for the purpose of healthy living, and that " Hygiene " cannot be treated as an isolated collection of facts and general principles which may be presented in a way little calculated to bring home to the individual their immediate application to himself. Health Education, viewed aright, involves activities and ideas the value and the significance of which should be presented in so *practical* a way that they are immediately and directly apprehended by the pupil. Its concern is pre-eminently with *health-behaviour*, and with the inculcation of ideals which will give conscious purpose to such behaviour.

* *See* page 78.

It may at times be necessary to introduce to the older pupils certain purely scientific generalisations about health, but these should only play a subsidiary part and should occupy their attention only when they are in a position to relate them to their own personal experience and needs.

The curriculum is likely to contain a number of specialised forms of training which have a direct bearing upon health. For instance, Physical Training, Organised Games, Housecraft (Cookery, Laundry, Housewifery), as well as Biology and Mothercraft, have secured a recognised place in school work. All these activities have a very direct bearing upon health, which is not always sufficiently recognised. Each has tended to keep to its own watertight compartment and the schools have directed their energies mainly towards imparting technical skill, or producing some particular form of achievement, and have not been sufficiently alive to the need for regarding all these special activities as contributing to one common end.*

2. Importance of creating a Right Attitude of Mind towards Health

The school, in addition to bringing the pupil to realise the connection between the health training he undergoes and the health studies he pursues, must make special provision for ensuring the creation in the pupil's mind of a right attitude towards health and a sense of its value to himself both as an individual and as a member of society. That it ought to be less difficult to do this in the case of Health Education than in that of the usual subjects of the curriculum will be obvious to all who realise how closely, and at how many points it touches upon the living experience of the child at school. But the school will not succeed in inducing in the growing child a proper outlook towards the study and practice of health and the prevention of disease, unless it consciously places the ideal of healthy living among those other ideals which are at any rate implicit in the broader conception of the function of the school of to-day.

Health Education thus interpreted will have, therefore, a far wider scope than that of any possible timetable " subject " of the traditional type. It will mean, in fact, a programme of training and of study designed to equip the pupil with the habits and the knowledge that will enable him to enjoy bodily

* Reference should also be made to *The Health of the School Child*, 1929 (pp. 37–55) price 2*s.* and 1932 (pp. 100–110) price 2*s.* 6*d.*, the Annual Reports of the Chief Medical Officer, published by H.M. Stationery Office. These annual surveys on the health of children at school frequently contain references to Health Education and should be regularly consulted by teachers.

and mental health both during school days and in later life. But the programme will only be really successful if the teaching itself is such as to inspire the pupil and to produce in him the right attitude of mind towards all those school activities which have as their common purpose the promotion of healthful living.

3. Planning a Programme of Health Education

Some guiding Principles.—The definition here adopted of the purpose and scope of Health Education will at once suggest certain general principles which must be observed in framing programmes of health training and health study designed to secure the three major objectives indicated, viz., the formation of healthy *habits*, the development of a right *attitude* towards health, and the acquisition of the necessary *knowledge* about healthy ways of living.

Securing the Active Co-operation of the Pupil.—All schemes and syllabuses, in the first place, will have to take into account *the point of view of the child* as well as that of the teacher. The teacher will think of his task as consisting not only of training his pupil in habits and of equipping him with the necessary knowledge and understanding; he will have in mind also the essential need of arousing his pupil's interest and of enlisting his co-operation in the training. *Training* in health, therefore, will not merely mean to him insistence on the performance of tasks which are prescribed for him, but it will include also the pursuit of activities voluntarily undertaken by the pupil. In the *study* of health, the presentation of new ideas by the teacher will be less important than the explanations which the pupils themselves ask him to give. In both the study and the training he will make every use of his own example and powers of suggestion in order to secure spontaneous effort on the part of his pupils.

Health Education touches the lives of their pupils at so many points that teachers should find no difficulty in planning realistic and co-operative activities " in which children with widely different talents can all contribute something to a common end that calls for and justifies their best efforts."* More detailed suggestions on this point will be found under " Methods " in Section 4 below, which also deals with the place of First Aid in the programme of Health Education.

* *See "Handbook of Suggestions for Teachers"* (H.M. Stationery Office, 1937, 2s. 6*d*.), page 139, section 25. Reference should also be made to section 48 ("The relation of 'subjects' to activities and first-hand experience") on page 38 of that *Handbook*.

Knowledge of Home Circumstances of Pupils.—In the second place, in drawing up schemes of work, teachers, whilst they will naturally be guided by such knowledge as exists on the subject of the needs common to all children, will also take into account the *home* circumstances of their pupils. They will make use of their own experience and knowledge of the needs of the particular district in which the school is situated. In districts where children live in poor and overcrowded conditions, the influence of the teachers in matters of health will be directly proportional to the knowledge they themselves possess of the home-life of their pupils, and if they use this information confidentially, sympathetically, and tactfully, in dealing with any particular child, they will not find it difficult to arouse in him an active interest and co-operation in carrying out the school programme.

Co-operation of the Staff.—The effective carrying-out of any programme depends on collective consultation and the co-operation of all the members of the school staff. The actual framing of the syllabus, especially so far as it involves knowledge of certain scientific principles, is a matter for joint planning on the part of such teachers as those responsible for Physical Training, Housecraft and Biology. The rest of the staff should not only be thoroughly acquainted with the programme but also prepared to do their utmost to further its carrying-out.

Every programme should provide for systematic practice during school hours of certain habits, such as those of personal cleanliness, but these habits are not likely to be firmly established if any member of the staff, whatever the subject he teaches, fails to do his part in enforcing their observance. Every teacher will, moreover, realise how his own attitude towards health must influence for good or ill the attitude of all the pupils with whom he comes in contact.

Co-operation with other Health Agencies.—It is no less important that those responsible for drawing up and carrying out the programme of Health Education should avail themselves of all the help it is possible to obtain from every type of health agency, both within the school world and outside. There are many statutory bodies, central and local, and voluntary societies, to which the school may turn in order to secure assistance in carrying out its programme.* Contact and co-operation with them is a material aid to the teacher in his work, particularly in dealing with his pupils as individuals. Most schools realise the importance of keeping in close contact with the work of the School Doctor, Dentist, and Nurse, or with the local Child Guidance Clinic where there is one.

* *Vide* footnote on page 99.

The Medical Officer of Health, who is usually also School Medical Officer, is always willing to give direct information to teachers in regard to the various branches of his work, and, so far as is practicable, to arrange for them to see something of the various activities carried out by his Department. The organisation of the *Infant Welfare* work and the arrangements made for the medical care and supervision of babies and of pre-school children should be of special interest.

The school *Medical Inspections*, too, provide opportunities for the teacher to become better acquainted with the home conditions of his pupils. Information about medical, surgical and dental clinics, welfare and other agencies, etc., may readily be obtained through the doctor, the dentist, or the nurse, who might occasionally also be asked to give talks on health to the whole of the school.

The End to be achieved through the Programme.—Finally, the whole programme of health should be conceived with the idea that it is intended to provide the child with the experiences, the ideals, and the knowledge necessary to ensure his leaving school capable, as an independent individual, of maintaining himself in health, and of putting into application, even when confronted by wholly new situations, the principles of health behaviour practised during his life at school.

4. Methods

Some General Considerations.—A programme of Health Education should be as flexible and elastic as possible. It must continually be readjusted as the result of experiment and trial. Similarly the methods adopted to secure the objectives aimed at must vary with the personality of each teacher and even with the personality of the individual pupil. The choice of method is the prerogative of the teacher. The suggestions made below are not intended in any way to infringe his rights. It may, however, help those responsible for carrying out the programme of Health Education to indicate some of the activities which have been found successful in practice. These will be briefly outlined in the following sections, which deal with the formation of health habits and the acquisition of health knowledge.

So far as the second of the main objectives of Health Education is concerned—the promotion of a right attitude towards health—it is obvious that this depends upon all those influences which constitute the general atmosphere of the school community as a whole. It is not primarily a question of organisation or of method. But the successful teacher is one who knows not only when to impart knowledge of facts and principles, when to explain or demonstrate, when to set his

pupils to discover facts for themselves, and when to drill or practise them in some form of skill, but also when to make special use of that *power of suggestion* which is an essential factor of all teaching where the guidance of conduct is the end in view.

In teaching Hygiene it is important to avoid arousing unduly self-consciousness on the part of the pupils or introducing to their minds anything that savours of morbidity or pre-occupation with medical topics. It is the child's prerogative to live a life of joyous impulse, to be forgetful or careless of himself. It would be a misfortune if Health Education were to result in a child's continually thinking about his body or in losing his spontaneity and naturalness. Hence in dealing with children's minor delinquencies in hygiene, good humour and a sense of proportion should be observed and special care should be taken not to blame them for what may be due to their home conditions or upbringing for which they are not responsible. The experienced teacher will rarely wish to single out children for reproof, to compare them unfavourably with others, or to question them in public with reference to their habits and ways of life at home. Such admonition as may be necessary should be given privately and individually and will always call for a high degree of tact combined with understanding and friendliness.

(*a*) **Habit Formation**

Value of Routine.—The desirability of arranging for a regular daily routine designed to promote the formation of healthy habits deserves to be carefully considered in connection with the drawing up of the school programme of Health Education. Time might profitably be found for the following activities in particular:—

Daily health inspection.—The precise aspects of health which will call for attention will vary from school to school and from stage to stage of each school. But they should include, in addition to such daily inspection as may be decided upon for the purpose of securing habits of personal cleanliness of body (face, hair, teeth, hands, etc.) and neatness and tidiness of clothing, etc., regular times for briefly discussing with the children the health habits they are from time to time being encouraged to form for themselves away from school.

In this connection there is considerable value in the systematic use of group or individual records. Further, the teacher will thus have a regular opportunity of noticing signs of ill-health, malaise, or undue fatigue, and particularly symptoms of communicable disease on the part of his pupils.

Weight and height records.—An invaluable means of enlisting the co-operation of children in forming healthy habits is to arrange for each class to be weighed and measured at intervals. Every child is interested in his own growth, and this interest has been found to act as a real incentive to the adoption and maintenance of healthy habits. The older children in each class could be made responsible for weighing and measuring themselves and for keeping such class records as may be adopted. Individual records might also be kept for the information of parents, and thus provide an additional means of securing their co-operation in the work of the school.

Meals at school.—Where provision is made for meals to be taken on the school premises a valuable opportunity is afforded for inculcating sound habits of eating as well as good manners. (See Chapter VII, page 80.)

At what stage of the school life the routine of habit formation should be discontinued will depend entirely upon the nature of the habit, the extent to which this habit is well established in the individual or the school, and the character of the children's home environment.

It is obvious that special importance should be attached to habit formation right up to the end of the Junior stage of the elementary school, where the emphasis should be upon the practice rather than upon the study of health. Further ways in which a practical habit-training in hygiene may be given are suggested in Chapter II.

(*b*) Acquisition of Health Knowledge

Regular periods for health study.—The need for introducing definite instruction in health will not be felt till the Senior stage is reached. Up to that point some of the routine activities indicated above and some of the forms of practical training suggested in the next chapter, which need not take place in regular set lessons, should suffice.

In the Senior School, it is recommended that there should be each week a period set aside for " health study." It should be employed for a variety of purposes and should on no account be devoted to a type of " class lesson," unfortunately still too common, in which the pupil is merely a passive listener. In Health Education inert ideas, as in any other part of the curriculum, are at all costs to be avoided. This special weekly period should rather be used as a means of giving unity to the child's health experiences both inside and outside the school, and to all the activities included in the programme of health training. It will also afford the teacher opportunities of judging how far the programme of Health Education has been successful and what modifications, if any, are needed.

These lessons will normally be given to the Senior children either by class teachers or, in the larger schools, by specialists in some particular subject, such as Physical Training, Housecraft, or Biology, and the choice will depend on the particular circumstances of the individual school. It need hardly be said that in a mixed school boys and girls should, as a rule, be taken separately for these particular lessons. In small schools responsibility for the instruction will normally be in the hands of the class teachers.

Practical and realistic activities as a basis for health study.—Certain branches of the curriculum such as Physical Training, Housecraft, and Mothercraft, which constitute in themselves practical applications of health principles, have this valuable quality, that they demand and readily secure the active participation and co-operation of the children. It has been found possible to introduce something of this realistic spirit into other school subjects through the development of various kinds of activities which may or may not be of the nature of "projects"*. Thus dramatisation in English, local surveys in History and Geography and practical surveying in Mathematics, have been found to give meaning and purpose to the more formal teaching of these subjects.

On the same principle it is most desirable in Health Education to provide adequate opportunity for such individual and co-operative activities of a practical and realistic character as will add life and significance to that necessary body of knowledge which children will have to acquire in order to understand the principles of healthy living. Thus local surveys might be made in urban or rural areas with a view to giving the children some insight into the way in which the Public Health Services actually function; or again, light may be thrown on many a health topic through visits to such places as the gas, electricity and water works, large dairies, cold-storage plants and Infant Welfare Centres. To the enthusiastic teacher many other opportunities of providing first-hand experience will readily suggest themselves.

First aid.—There is one form of activity connected with health which is pre-eminently suitable for inclusion in the school programme of health training and study, and this is "first aid." Its practice on systematic lines not only provides a motive and a reason, readily intelligible to children, for introducing the kind of information, usually given in schools, upon such topics as the skeletal structure of the body, the nervous system, the circulation of the blood, and the need for

* See the "*Handbook of Suggestions for Teachers*," page 157 (H.M. Stationery Office, 1937, 2s. 6d.).

protection against germs, but it also gives unity and purpose to such lessons. First Aid, moreover, would make an instant appeal to the older children, both boys and girls, and would undoubtedly enable the rising generation to render efficient help in many future emergencies on the road or elsewhere.

There are certain simple forms of First Aid which every boy or girl should be capable of rendering. These should be included in the programme for girls as well as boys of the age of 13 years and upwards and should constitute the basis for such class instruction as it may be considered desirable to give upon the form and functions of the human body or of the conditions of bodily health which are dealt with in Chapters III and IV respectively of this Handbook.

While such experience is equally valuable to both boys and girls, there is a special reason for giving the boys a fuller and more systematic course of instruction in the fact that their curriculum does not offer them the same opportunities for becoming practically acquainted with the elements of first aid as does the normal curriculum of the girls.

In deciding what to include in a course of First Aid with school children there are two considerations by which Head Teachers will be guided. The first is whether there is on the school staff someone who either has gained a certificate after attending a course of training held under the auspices of the British Red Cross Society or the St. John Ambulance Association or some similar organisation, or possesses sufficient knowledge and experience to deal with simple forms of First Aid. The second consideration is the importance of not expecting, or training, children to take responsibilities in advance of their years, for in rendering certain kinds of First Aid it is easy to do more harm than good. It cannot be made too clear to the pupils that the immediate purpose for which they are being instructed in First Aid is to enable them:—

(*a*) to recognise whether the injury sustained by the victim of an accident of any kind necessitates *sending at once for a doctor;*

(*b*) to render such immediate help as will prevent the sufferer from sustaining further injury to his system.

Life-saving.—It is most desirable that instruction should be given wherever possible in life-saving from drowning. This activity has been practised with great success in a large number of schools in all parts of the country and its inclusion in a regular course of First Aid on the lines indicated above—as a realistic activity which provides a practical basis for theoretical instruction—would prove an admirable means of deepening the children's interest in Health Education.

Examples of topics suitable for individual "research" or for class study.—The older children can sometimes usefully be led to choose from a list of subjects suggested for individual investigation. These might be treated as a kind of "project" which would occupy them at intervals during the whole term, or even longer. Such information and illustrations as they might collect together would eventually be put at the disposal of the whole class, and from time to time would provide material for short lectures by individuals or for class debates.

Children would, of course, need help as to the sources from which information could be obtained, and should be given every opportunity of availing themselves of the School Library, the Local Library, etc., but they should otherwise be left mainly to their own efforts when they have once started. The teacher would of course take a lively interest in the progress of each of the projects, without however appearing to criticise or direct until the work is complete and has become public property.

The list would include subjects likely to tax the powers of the most capable of the children, as well as others which would give scope to the so-called backward boy or girl, or the pupil who is not of a bookish turn of mind but has plenty of practical intelligence. The wise teacher's influence would be shown mainly in giving advice as to the choice of subject.

The following are some examples of topics of the kind indicated:—

> Where my breakfast comes from and how; why children are vaccinated; washing clothes; spectacles—past and present; labour-saving appliances in the homes; the essentials of a healthy bedroom; electricity *v.* gas for heating and lighting; oil stoves *v.* gas stoves; the lighting of the town; the lighting of the school; how our school is ventilated; windows of all times; how to choose a holiday place; how to choose clothes; how to choose shoes; footwear through the ages; great medical discoveries, e.g. circulation of the blood, anaesthetics, antiseptics; human and animal teeth; recipes for washing hair, curing colds, common ailments, etc.; baths—ancient and modern; how athletes train; the benefits of walking; picnics—how to make the best use of them; good and bad toys for little children; good and bad lunches to bring to school; corns and chilbains; choice of games; rubbish dumps; litter; water softeners.

The Last Year of School Life.—In the last year of school life an attempt should be made to gather up the work of previous years. The pupil before he leaves school should be expected to know:—

(*a*) how to keep himself healthy and clean (nose, ears, eyes, skin, teeth, bowels, etc.);

(*b*) how to render first aid* in case of illness and accident (stings, cuts, burns, bruises, etc.);

(*c*) how, in the case of girls, to do sick nursing and to prepare invalid food; and to know something about Infant Care;

(*d*) where the local Clinics, Welfare Centres, and Hospitals are situated;

(*e*) what precautions to take with a view to protecting the general public when there is a case of infectious illness and why such precautions are necessary;

(*f*) something about important discoveries made in medical science in the past and at the present time, and how they have benefited mankind;

(*g*) something about National Heath Insurance and the Hospital Savings Associations.

5. Links with Other Branches of the School Curriculum

Opportunities afforded by some subjects of illustrating health principles.—Various branches of the curriculum may with advantage be linked up with education in health. In some subjects the link is very close, as with Physical Training, Housecraft and Mothercraft, which may be regarded as practical applications of the principles of Health Education. Biology, too, dealing as it does with the conditions under which living creatures thrive or deteriorate, reinforces both the practice and the study of health. The care of small animals, for instance, will give numerous examples of practices which are favourable or unfavourable to their growth and vigour. The science of Biology as a whole, in fact, is important for the student of hygiene precisely to the extent that human beings are subject to the laws which govern other living beings.

There are other subjects, too, which though they have, in themselves, no immediate bearing upon health, yet have a valuable contribution to make to its study. In particular,

* In some schools it may be practicable to arrange with the St. John Ambulance Association or similar organisation for a first-aid course, especially for older boys. Boys and girls will receive excellent training in this direction by joining the Boy Scouts, Girl Guides, Junior Red Cross Societies, or other similar bodies. Suitable elementary text-books on this subject are obtainable.

History and Geography, which are concerned with the life and achievements of mankind under varying conditions upon the globe, can provide valuable illustrations of the importance of observing the principles of health, and throw light upon their gradual recognition and acceptance. Thus, in the teaching of History, attention might be drawn, when a suitable opportunity offers, to the place of health or disease as a decisive factor in the lives of individuals or in the development of communities.

But the teacher should be careful to avoid anything of the nature of forced or unnatural "correlation" and he should especially guard against giving any grounds for the suggestion that he is using his own interpretation of history in the interests of partisan propaganda. Neither in History nor in Geography should his choice of method, or the order in which he presents his facts and principles, be affected by disproportionate emphasis upon factors connected with health.

It is in the light of the principles indicated above that the following sections, as well as Chapters V and VI which deal more fully with Biology and Mothercraft, should be read. They contain a number of points of contact with health which should be taken into account when the programme of health education is being drawn up or discussed by the members of the school staff.

Physical Training.—Physical training exercises, in the playground or in the gymnasium, organised games, dancing, and swimming, have so direct a bearing on the promotion of health that they may for practical purposes be regarded as integral parts of Health Education. It is true that among the purposes of these activities is the production of certain forms of bodily skill, a certain quickness of response, and certain moral qualities; but it is equally true that they create a state of bodily welfare and tend to promote a healthy way of life. Regular periods of activity, especially when taken in the open air, the systematic exercises and strengthening of muscles, internal as well as external, and the practice of the proper methods of breathing, are obviously the means of making the body strong and hardy. The resulting sense of well-being and power should lead to a consciousness of the value of physical fitness and a desire to do anything that tends to promote it. This desire on the part of his pupils affords to the specialist an excellent opportunity of furthering the cause of Health Education, especially with the advent of playing fields, gymnasia and changing-rooms.

Housecraft.—The majority of girls of eleven and twelve are not by nature interested in hygiene as such. From the moment they enter the Housecraft room, however, practical

hygiene becomes an integral part of what they are doing. Clean hands, aprons, and caps, are the indispensable preliminary to each day's work, and from the start each group of girls is trained in the best and most expeditious method of cleaning sinks and kitchen utensils.

In Cookery the children are accustomed to the scrupulous care needed in preparing and serving food; but it is only by repeated attention to the less glamorous processes, such as "washing up," that a teacher can help them to acquire a right standard of cleanliness, and habits which will enable them to maintain this standard when they are no longer with her. Laundrywork, too, provides unique opportunities for assisting the girls in their personal hygiene through the proper treatment of their clothes; and here, as in Needlework, advantage can be taken of their growing interest in their personal appearance. Experience shows that it is in Mothercraft, about which more is said in a later chapter, that their response to cleanliness is quickened, more than in any other way, by the daintiness of the layette and the niceties of bathing the baby. They are also ready, while the Housecraft room is still a novelty to them, to take an interest in such matters as the water-supply, drainage, and the disposal of waste—matters which are again of primary importance later in the course when they are considering the complete management of a home.

Clearly the girls' sense of responsibility for maintaining the standard set in the Housecraft room will be steadily undermined, if they are not expected to conform to a similar standard throughout the school. Indeed, every pupil should make a contribution towards maintaining a high standard of cleanliness in the school generally. The polishing of individual desks, the care of flowers and vases and of wash-basins, the disposal of litter, and the practice of those habits of carefulness and foresight, which tend to eliminate untidiness and to prevent the creation of unnecessary labour, are all means of putting good teaching into action.

Finally, the everyday life of the school will provide occasions, such as the Assembly particularly, when the teaching of the Housecraft room on such points, for instance, as the care of the school uniform, personal tidiness, and cleanliness, can be strongly reinforced.

History.—In the teaching of History many opportunities arise of showing the place of hygiene in the life of peoples in different ages and at different stages of civilisation. Diseases have had far reaching effects upon the destinies of nations: malaria in Greece; plague in Rome; ague, cholera, plague and smallpox in England; the Black Death in Europe and leprosy in the East.

It is not unreasonable to suggest that teachers in taking History with older children should, when they come to select from the vast number of topics calling for inclusion in the school syllabus, not lightly pass over the claims of Health Education. The standards of hygiene in any age are of fundamental importance and it is doubtful whether any period of history should be studied without reference to its prevailing ideas about sanitation, housing, cleanliness, water-supply, disposal of refuse, treatment of disease, and similar topics. To deal in outline with one or two of these aspects of social life in a few History lessons every term for two or three years after the age of twelve or so, would greatly help to give a truer background to the study of any period and would provide constant opportunities for comparison with our own times.

This purely historical treatment of the development of hygienic standards of living for all classes of people is likely to produce a keen and lasting interest in matters of health. It is particularly valuable if children are trained year by year to find out, for example, the history, in their own area, of the water-supply, of infectious and contagious diseases, of the disposal of refuse, of the treatment of the sick and poor or of the development of the School Medical Service, and to make comparisons with the history of other areas in these respects. In this connection, every boy and girl before leaving school should have been trained to take a sensible interest in the history of our Public Health Services and to know something about the way in which they function. Such an interest would tend to make them actively and lastingly conscious of what the term " citizenship " connotes.

In the hands of keen, thoughful teachers of History the focussing of attention, for a few lessons in a term, on these important factors in the development of civilisation could hardly fail to have a profound effect on the attitude of their pupils towards Health Education.

Geography.—The teacher of Geography will find in his subject many examples of factors which influence the health of the individual and the community. Physique and social life are affected, for instance, by climate and natural conditions. Parts of the world like Switzerland, Egypt, California and New Zealand, have become famous as health resorts; others are notoriously unhealthy; others again, like the Panama zone, have been converted from unhealthy into healthy regions. Humanity in certain areas is liable to be afflicted by deadly diseases, such as cholera, malaria, plague, sleeping sickness, and yellow fever, or those more lingering infections such as hook-worm disease or leprosy, all of which owe their origin to certain climatic conditions and their spread

to certain insect or animal pests, and to which some races more easily succumb than others. Human beings themselves, too, do much that has an adverse effect upon their own health, as may be seen in countries where magic and superstition flourish and tribal customs or social habits and institutions militate against healthy living.

On the other hand, the advance of civilisation has vastly augmented the food supply, facilitated transport, and developed refrigeration and other methods of preserving food which have changed our dietary and improved our health. The growth of internationalism and the creation of the League of Nations have led to international sanitary codes of great importance. Through them much has been done to prevent the spread of infection directly or indirectly through merchandise, travellers, or immigrants, whether conveyed on the sea or in the air.

Points like these might reasonably be expected to come under review in any normal course of school geography for Senior children. If they are presented to them in a vivid and arresting way, with due regard to the relation between cause and effect, they cannot fail to deepen the interest of the children in matters of health, especially as they affect the life of the community.

CHAPTER II

THE PRACTICE OF HEALTH HABITS

Introductory Notes on the Use of the Chapter

(i) *Practice before Theory.*—In the opening chapter of this pamphlet special stress has been laid on the need for putting practice before theory, experience before explanation. Learning healthy ways of living must precede learning *about* health. It is in accordance with this principle that the present chapter, which is concerned with the routine of habit formation is placed where it is in relation to the four other chapters which deal with Health and the School. It consists mainly of suggestions, set out for convenience in the form of notes and headings, which it is hoped will help teachers not only to draw up a regular programme of exercises designed to train their pupils in the practice of health under their own supervision in school hours, but also to indicate ways in which the children can train themselves to be healthy in their out of school life.

In the chapters which immediately follow this one teachers will find material upon which they can draw for such theoretical instruction as they may consider necessary for their older pupils in order to enable them to understand the reasons for adopting the practical training provided for in this chapter. Chapters III and IV, which deal respectively with " Body and Mind " and " Conditions of Bodily Health " provide the background of health knowledge with which all teachers should be familiar, if the practical training given by them is to be successful. The two remaining chapters on " Biology and Health " and " Mothercraft and Infant Care " should be of special interest to those specialists who are responsible for the teaching of Science and of Housecraft, respectively.

(ii) *Need for a regular Routine.*—It is in the earlier years of school life that the adoption of a regular routine of habit formation is a *sine qua non*. But, as it is important that the training given to the younger children should result in the development of habits which will be lasting, much of what is suggested in the notes below will apply also to children in the Senior School.

For the Infants and Juniors there should be no systematic instruction of a formal or theoretical nature on such subjects as the need for personal cleanliness or bodily exercises, the care of the body and its sense organs, ventilation, etc. Apart from such individual oversight as circumstance calls for, five to ten minutes a day may well be assigned to the practical habit-training in hygiene, the method adopted varying with

the age and requirements of the child. One teacher may choose to make a daily inspection of the children first thing in the morning; some particular lesson such as drawing may be utilised as an appropriate opportunity for dealing with cleanliness; lunch or a mid-day meal may furnish the occasion for a talk about the care of the teeth; simple physical exercises in the classrooms on a wet day provide a natural opportunity for discussing fresh air and open windows; and nature study readily leads to brief practical applications of physiology.

(iii) *Health Behaviour the result of Practice in Health Habits.*—However and whenever taken the health teaching should not be haphazard or diffuse, but clear cut and definite. It should be simple, direct, personal and individual, and should aim at the formation of healthy *habit*. For instance, the teacher should require the children to have clean faces and hands, clean hair, clean teeth; and cleanliness should be repeatedly practised by the children until it has become a habit. The teacher can accustom the children to fresh air in the school room—its necessity for the lungs and the blood, the ways to obtain it, the advantages of the open-air life, the value of exercise in the open air, the health-giving virtue of sunlight. The teacher can provide every day a suitable class breathing exercise; much of the prevalent mouth-breathing which predisposes to disease, is merely due to bad habit and ignorance. Or again, the children can find by practice the relation of activity and rest, of exercise and sleep, the peacefulness of quiet conduct and silence. There is often too much clatter and restlessness for young children to grow and ripen, and nervous conditions may be the result of ceaseless and meaningless activities. Let them learn that composure and rest are conducive to health and mental stability. The children can be trained in their proper seating, their right posture in their seats, the personal use of their own pens and pencils, suitable habits of hygiene in the cloakroom, and the ventilation and cleanliness of the classroom.

It should be remembered that the health of a nation is in large degree dependent upon the habits of the people. What they need in order to live well is not abstruse knowledge but to utilise the knowledge they possess already. Most people know a great deal about the value of cleanliness, fresh air and simple food, but they do not always practise what they know. *They have not in youth contracted the habit of doing so.*

It will be understood, of course, that it is not intended that the material supplied in the following notes should be directly passed on to the children, either in the order or in the form in which it appears.

1. Fresh Air and Sunlight

(*a*) Value and Need of Fresh Air

The value of fresh air and sunlight. Fresh air vital to the lungs; they need *pure* air. The best air is out of doors.

Hence children should play out of doors whenever possible, running about, skipping, taking part in games; children should contract the habit of being out of doors, in the parks, etc.

Children may help in the opening of windows.

Do children sleep with open windows?

The best way to get warm is to run about, not to sit over the fire; the best way to keep warm is to put on a coat.

(*b*) Breathing: Use of Handkerchief

(*This should come principally in connection with singing and physical training.*)

Children should be taught how to breathe; deep breathing is best and it comes naturally when children run about; breathe through the nose. Nose to be kept clean and with air passages quite free. Danger of mouth breathing; function of nose to warm and filter air.

Every child should have a handkerchief and be taught how to use it properly; (value of handkerchief drill and clean handkerchief). Each child should use its own handkerchief only.

Practise breathing exercises before singing lesson.

2. Cleanliness of the Body

The face, hair, ears and hands of the children should be inspected regularly.[1]

Children should be clean for their own sakes and for others; appearance; danger of uncleanliness to cuts and sores; spoiling of books, needlework, etc.; objectionable smell from dirty children; unpleasant to handle food with dirty hands; desirable to wash before eating.[2]

Care and appearance of the hair; advantages of short hair; need for frequent brushing, combing and washing; unpleasantness and danger of unclean heads; use of fine comb; each child should use its own cap and hat only.[3] Diseases transmitted by body parasites.

Lessons in how to wash and dry properly. Warm water best for cleansing purposes, cold for tonic; face, neck and hands need most washing.

Special care of nails; to be kept short and clean; nails not to be bitten.[4]

Whole body should be washed at least once or twice a week; or a daily sponge and rub down with rough towel.

Need for cleanliness of body inside as well as out; bowels should be moved at least once a day, at a regular time each day (preferably early in the morning).

Notes.—[1] In schools where a link with the Junior Red Cross (see Chapter VIII, p. 99 has been formed, a pupil who is a member of the Committee is made responsible for this inspection. The children in no way resent it, but are keen to take their turn in carrying out this duty.

[2] The teacher of Science can create the right feeling about this with all classes in the school. The influence, in this matter, of the older pupils spreads down through the lower classes.

[3] The ideal course would be for each pupil to have his own brush and comb in a bag.

[4] Nail cleaners can easily be made by the children.

3. Sleep: Importance of Rest

(*Sufficient sleep is difficult to provide for when a family lives in one or two rooms and children have to sleep in the room used by the family as a living room. The ideal conditions must, however, be put before the child.*)

Importance of rest and sleep in childhood. Early to bed: how many hours in bed are the children getting?

Advantage of well-aired room; open window; important to have through current of air.

Darkness (or subdued light) and quietness induce sound sleep. Value of rest in a recumbent position in middle of day for young children.

Note.—See Chapter IV. p. 50 for hours of sleep recommended.

4. Care of Clothing

Clothing and boots of children should receive consideration.[1]

Need for keeping clothing dry; overcoat or mackintosh for wet weather; drying of wet clothing.

Need for weekly change of underclothing (twice a week if necessary); no clothing worn during the day should be worn also at night.

Children should not wear too many clothes; value of wearing simple clothing, loosely woven and unrestrictive; clothing to be of washable material whenever possible; brushing of clothes; cleaning of boots and shoes; importance of

tidiness and prompt mending;[2] buttons and tapes properly sewn on; stocking and socks kept mended;[3] proper hanging-up of garments in cloakrooms.

Special danger of wet feet; good boots; utility more important than appearance; changing and drying of wet boots.[4]

Notes.—[1] The practice adopted in some schools of using the occasion of a medical inspection to call the attention of the children's mothers to the question of suitable underwear is to be recommended.

[2] A "mending lesson" should be arranged for once a month in the time set apart for Needlework in the case of girls.

[3] In some schools the children's feet are regularly inspected before they go for a swimming lesson.

[4] These points should be pressed home as occasion arises in wet weather. Arrangements should be made for children to change their boots or shoes at school.

5. Care of the Eyes and Ears

Children should at once tell their teacher if they are unable clearly to see words in books or on writing paper or on the blackboard.[1]

Need for getting a good light on all work: not to read or sew in a bad light at home.

Habit of bending over work or straining eyes by "fine" work should be avoided.[2]

Danger of putting anything hard into ears; children should not strike each other, or be struck by anyone, on the ears.

Ears should be kept clean (well rinsed and carefully dried).

The interest of the children should be aroused in the testing of the eyesight and hearing; if spectacles are worn, their daily cleaning should be practised.

Notes.—[1] On the notice board of each classroom a list may be shown of those children who should wear glasses.

[2] The position of the books in reading should receive attention.

6. Care of the Teeth

The ivory gateway; beauty of a clean set of white teeth something to prize; the more teeth are used the better for them.

How to keep teeth in good condition. A lesson in cleaning the teeth; how to use a tooth-brush; up and down movement of brush; use of soap, simple tooth-powder or disinfectant; thorough rinsing of mouth.

Teeth to be cleaned just before going to bed (no food or drink afterwards); harmfulness of sweets and biscuits just before going to sleep.

Dentist should see children's mouths periodically; this may save much pain and trouble later on; do not wait till teeth ache; any tenderness to pressure, sensitiveness to sweet things or hot and cold drinks, are danger signals.

Value of certain food in cleansing the teeth (crusts, fruit, fibrous foods, and especially raw apples).

Breathing through the mouth is harmful to the teeth; always breathe through the nose.

Note.—Diagrams such as those published by the Dental Board should be in frequent use.

7. Wholesome Food and Eating Habits

Adequate nutrition is the best protection against illness and ensures a better and quicker recovery from fatigue.

Children should be encouraged to like such foods as milk, butter, eggs, bread that is not too new (crusts), fresh fruit, green vegetables; avoidance of faddiness over food (often due to injudicious coaxing, a common fault in training young children).

Meals should be regular in period of time; no food between regular meals; eat slowly, chew food well; not too many sweets.

Children should not eat dirty food, unripe or over-ripe fruit, the remainder of food someone else has partly eaten, or food which has harboured flies.

Advantageous to drink water when thirsty, preferably between meals; young child better without tea or coffee; never drink with food in mouth; not to share glass or cup with another child.

Hands should be washed before meals.

Food should be eaten sitting down to the table in orderly fashion; lunches and school dinners to be eaten with attention to manners.

Young children can be taught to serve meals, to wait on each other, and to clear away.

Note.—Children under 11 are quite capable of understanding the reasons for forming proper eating habits. The whole matter of diet should be made as personal as possible by giving reasons and showing what happens if rules of health in connection with feeding are neglected, and how the resulting bad effects might have been avoided.

The importance of the early formation of correct habits in feeding should be taught in connection with the course in Mothercraft and Infant Care followed by the older girls.

8. Clean School and Proper Use of Equipment

Children should be taught to take pride in their classroom and in the school generally.[1]

Dusting: keeping desks and cupboards tidy.

Children should use their own school materials—especially pens and pencils; pens and pencils should *never* be put into the mouth.

Hands should be kept clean so that school books and papers are not soiled.

Children should assist in keeping floors clean by wiping their boots on mats and changing into school shoes in wet weather.

Instruction should be given, where necessary, in proper use of sanitary closet; importance of privacy and decency; need for scrupulous cleanliness of body after use of closet (use of toilet paper).[2]

Notes.—[1] It would provide a valuable stimulus for the formation of habits of tidiness if the competitions between "Houses" now very generally adopted were extended so as to include this aspect of Health Education.

[2] The creation of the right attitude in the mind of every individual child to this aspect of Health Education is of great importance.

9. Visits of School Doctor, Dentist, and Nurse

The visits of school doctor, dentist, and nurse, are opportunities for Health Education of the children.

Train the child to look upon doctor, dentist, and nurse, as part of the ordinary school staff and as wise and practical advisers for their health.

Advantage of taking height and weight at the beginning and end of each term: it will interest the children and help to make them do all they can to keep in good health.

Note.—Discussions after medical and dental inspections should take place between the teachers and the headmaster or headmistress. Information given by the doctor or the nurse should be passed to the staff and children should be encouraged to obtain the medical or dental treatment recommended. Lessons on the teeth, eyes, tonsils, ears, etc., might follow soon after an inspection and lessons on cleanliness of hair, etc., after an inspection by the School Nurse.

These and other suitable opportunities should be taken by teachers of emphasising the physical and mental disadvantages of the cigarette habit, sometimes contracted by young boys.

10. Safety First

Children should learn the right way to cross streets; the special dangers to avoid (motor-cars), dangers of "lorry riding" and "last across."

Young children should be warned against getting too near a fire or meddling with kettles, etc., on the fire; of the risk of throwing orange and banana skins about; of the danger of eating unknown berries; of the careless use of scissors, needles, knives, forks, sticks, etc., and of walking on slippery surfaces or ponds covered with thin ice.

Other dangers against which they should be warned might include: inefficient fire-guards, celluloid toys and those made of painted tin or fluffy materials, loose floor covers on slippery oilcloth or polished wood.

Note.—The Safety First Council offers valuable advice and arranges films and essay competitions to bring home to the children the need of looking before leaping.

Reference should also be made to the Report of the Inter-departmental Committee on Road Safety among School Children, 1936. Price 6*d*.

11. Physical Exercises, Swimming, and Games

This section should be read in conjunction with the Board's Syallabus of Physical Training, 1933, with Chapter V of the "Handbook of Suggestions," 1937, and with the Report of the Consultative Committee on "The Primary School."

Children should be trained to play together, to use their limbs freely with increasing control, to move quietly and to develop balance; a sense of rhythm may be fostered by music and dancing.

Games should be free and unhampered but not aimless. They should be simple, but children must learn to keep to the rules and to play "fair." Games should lead to alertness, independent action and a ready response to unexpected directions.[1]

Physical exercises and games should develop in the child a bright, happy, fearless, independent spirit. The children should be encouraged to make effort, though detailed perfection in young children should not be expected.

In all physical exercises and games correct breathing is important; one of the chief advantages of physical exercises is the development of breathing capacity.

Of all games, those involving the throwing, hitting or kicking of a ball appeal most to the sporting spirit and are most successful in giving mental and physical *poise* to the child. Riding and swimming are invaluable if within reach.[2]

Notes.—[1] The need for putting on a coat when hot after a game should be pointed out.

[2] Care should be taken not to attach too much importance to racing, whether in swimming or athletic sports, especially in the case of young children. Emphasis should always be placed on the need for being a good "loser."

CHAPTER III

BODY AND MIND

1. Three Essential Conditions of a Full, Healthy Life

Such things as air, water, food, and rest, are so urgently necessary for the body that deprived of any one of them life itself ceases in a few minutes, hours, or days. But for the full healthy life and development of the civilised child there are many other essentials. He needs around him air that is fresh and moving, food and water that are wholesome, and rest that takes the form of quiet and prolonged sleep; and in addition he needs light, warmth, cleanliness, play, work, and happiness. His needs far exceed those of the animal or the savage, but the health that he thereby attains is all the more positive and vital, because it is mental as well as physical.

There are three essential conditions for the enjoyment of physical health. The first requirement—given a sound body, born of good "stock,"—is its nourishment and training throughout life. The second requirement is the protection of the body against hurtful agencies, and is part of man's perpetual conflict with his environment. Thirdly, there is the immediate and effective treatment of any damage, deficiency, or disease, in the body as soon as it can be detected. The earlier a disease is dealt with, the more practicable is its cure. But childhood is the time not only to cure diseases which have actually begun, but also through timely recognition of danger signals to prevent other diseases from establishing themselves. Fulfilment of these three requirements—the care of the body, the control of environment, and the treatment or the prevention of disease—constitutes the Way of Hygiene. There can be no dispute as to their validity, for without them a healthy life is impossible.

It is obvious that guidance and direction are needed by the uninitiated child if he is to find and follow this pathway. He cannot find it by chance nor can he follow it by guessing. To provide the guidance and knowledge is the task of the school teacher, though he should realise that much will be accomplished through the wisdom of the body itself. It is nurture and training that the child needs rather than instruction. Yet, like all arts, nurture has its science, and it is the business of the teacher to make himself familiar with this science.

In doing what he can to promote the physical health of his pupils the teacher should realise that he is at the same time promoting their mental health.

" The highest attainments of the human spirit," says Professor L. P. Jacks, " require the body as well as the mind to be enlisted in their pursuit. It is a principle with a very broad application. It applies not only to the high attainments of the mystic, the genius, the creative thinker, but to the everyday virtues of the common man: self-respect, self-control, courage, trustworthiness, decency and clean conduct in general. These also are unattainable unless the body as well as the mind is enlisted in their pursuit."

2. Importance of a Healthy Mind

The older children should be taught the intimate association between body, brain and mental health. In other portions of this Handbook the hygiene of the body will be dealt with, and is of paramount importance. It should be remembered, however, that the health of the mind is also important, and unless it is sound the whole body will tend to degenerate. Thus, physical fitness should be advocated by the teacher not only as an end in itself, but as a means to promote the mental and moral health and character of the child. The child is an individual with his own desires, emotions and propensities. The development and expression of individuality involves psychological development, just as the completion of personality depends on social, and the balanced body on physical, factors. The duty of mental fitness may be urged because this will make the children more useful persons in the world, better able to help other people, and equipped to undertake work and occupations suited to them. They should learn that good health is not merely a matter of the body but that the child really worthy of the name of a healthy child is healthy mentally and morally as well as physically.

The key to mental hygiene lies in building up the innate character of the child. (i) First, there is a normal body with particular *senses* and sensations; secondly, there is a mind with *impulses*, emotions and will power. The guidance and cultivation of these elemental powers is necessary to health. The child instincts of movement, of play, of imitation, of curiosity and of life preservation, call for direction. Their growth is aided by emotions, by sympathy, by sociability, by sex. These are the materials out of which character and conduct are to be built. It was Ruskin who said that " education is not to teach a man to know what he does not know, but to behave as he does not behave." The task of the teacher is to take these primitive faculties and train them by inducing habits of inhibition or cultivation. (ii) To do this there must be *springs of action*, the desire for happiness and usefulness in girls; the desire for risk, adventure, fame,

and service in boys. (iii) There must also be a clear conception of the *fundamental ends of life*, strength, beauty, goodness and truth, as expressed in an intelligent, adaptable and reliable child, capable of sustained endeavour. These qualities cannot come by chance. They are effects of causes. They must be constructed out of the senses, the impulses, and the primitive emotions common to mankind.

The degree of emotional control is an important index; the psychology of fear, for example, shows how ramified and complicated the child's mental structure is. A child's nature harbours all the fundamental emotions which are common to man—love, jealousy, hate, revenge, fear, shame, suspicion —and responds to emotional situations in much the same way as does the adult, except that its feelings are more direct and less controlled than in later life. The child whose conduct is due to excessive fear or morbid terror is being wrongly brought up. A child's feelings are the driving forces of his personality, and are a proper object of all educative efforts, which should aim at moulding them in the course of years to forms that are acceptable when judged by cultural standards. Without sound mental development there can be no enduring bodily health or freedom from fatigue nor yet a healthy outlook on life.

3. Value of a Healthy Outlook

To ensure that a healthy outlook is fostered in children, the prime necessity is that the body and the mind should be healthy. The child should be encouraged to interest himself in the world around him; to concentrate on the task in hand; to exert himself to overcome difficulties; and to appreciate the value of his own health and that of others. Hence the importance of cheerfulness and courage. He should gradually assume his right share in responsibility. He may begin by having certain duties in connection with order and cleanliness of the school; then with " things going right " in the school he should learn to be, as occasion demands, either a follower or a leader. The illimitable effect of moods and actions on the world must be explained, and that to be sulky, to brood, to be irritable, greedy, seeking only his own advantage, and the like, have not only a deleterious effect on his own health and character, but have a definite influence on others, and may be positively harmful to them. " Difficult " children in particular call for special attention and for the study of these children child guidance clinics are being established in various parts of the country, which are proving helpful to the teacher and parent. In connection with the mental health of the children there are three facts of which we may be sure. First, that mental disorders are almost as common as physical

disorders, and are due, not to " fate," but to definite causes, many of which are preventable. Secondly, if we neglect the mental health of childhood we cannot escape its results in many kinds of mental ailment—dull, backward, neurotic, " difficult," or delinquent children. True mental defect (feeblemindedness, imbecility, and idiocy) is often inborn; but neglect, or unsatisfactory environment, or inadequate training and nurture will assuredly lead to abnormal development. Each child must be observed to see that mentally he " evinces a steady willingness to grow up; " that he is neither held back by " the call of the cradle," nor misdirected by the " grown-up " life becoming too threatening. The former may tend to infantilism, the latter to over-pressure and the making of little old men and little old maids. Thirdly, the child is so constructed of body, mind and spirit that he cannot live at the full height of his human capacity unless harmony between all three be attained. In so far as it is reached he has health, wholeness, oneness, the best of which his particular body is capable.

4. The Structure and Functions of the Body*

Though man is higher than the animals his body belongs to the animal kingdom, and its structure follows the type of other mammals. Thus it consists of head, trunk and limbs. The skull (brain case) is at the top of the back-bone (spinal column) which itself contains the spinal cord, the continuation downwards of the brain. The trunk is divided into the thorax, which contains the heart and lungs, and the abdomen, which holds the stomach, alimentary canal, and its ancillary organs. The arms and legs are designed for movement. The skeleton is jointed together as a frame-work of bone and cartilage, supported and moved by muscles. It is so designed as to give position and protection to the vital organs of the body by which we live.

The lungs, which are connected with the open air by the windpipe and nasal passages, are composed of air sacs, the thin walls of which are covered with a network of blood vessels. Here there is a circulation of air; by means of the respiratory movements of the chest which ventilate the whole of each lung, used air is breathed out, fresh air is breathed in.

* N.B.—Any theoretical instruction which it may be considered desirable to give to the older children on the structure and functions of the body would gain immensely in value if it were linked up with practical training in First Aid. Thus, the skeletal system might be discussed by the teacher in connection with his explanation of the first aid treatment of fractures. Similarly a description of the circulatory system would fit in appropriately with practical instruction on the control of bleeding, etc. *See* page 19. (Chapter I, section 4) above.

The blood gives up its waste products to the air in the air sac, and in exchange receives fresh oxygen to carry to all parts of the body. The blood circulates by the force of the heart, a four-chambered hollow muscle; the right side of the heart receives the used blood from the body which it pumps to the lungs for purification, the left side receives the oxygenated blood from the lungs and pumps it through the whole circulatory system—arteries, capillaries, veins—from which it returns to the right side of the heart. Thus a circulation is maintained of air in the lungs and of blood in the circulatory system, the purpose of which is to carry to the tissues of the body the oxygen which is necessary to their life. The blood also carries nutriment, which it obtains from the alimentary canal as a result of digestion, and deals with harmful germs which enter the body.

The digestive system consists of mouth, teeth, muscles of mastication, salivary glands, stomach, intestines and accessory glands. Food taken into the mouth (*a*) becomes, in due course, part of the body tissues, and (*b*) is stored by them to form an available source of energy. To reach them it must first be digested, in the mouth, stomach and intestines, where it is not only churned up but is changed by ferments and other secretions as it passes down the alimentary canal. From the walls of the intestine some of it is absorbed into the lymph vessels and thus reaches the blood stream through the " thoracic duct," some of it gains direct access to the blood vessels of the intestinal wall, and some of it indirectly passes to the liver. But, in whatever way food reaches the circulatory system, it is the blood which carries it to the tissues. As the blood must obtain both the oxygen and nutriment which are necessary to the life of the body, so also it must get rid of the waste products which it gathers from the tissues. The organs which " excrete " these waste matters from the blood are the lungs, kidneys and skin—all three should be kept clean and active. Such part of the food as is not nutritious is cast out of the bowel daily.

The nervous system, consisting of the brain, spinal cord and nerves, has control (though in an unequal degree) of all parts of the body; it serves to link up and connect them and ensures harmonious working between them. The brain, in which every portion of the body is represented, is the central authority. It receives messages and sensations from the skin or other parts by way of the nerves or the spinal cord. It translates them, despatches the answering messages to the muscles, and controls and regulates the resulting actions and co-ordinations. The nerves, which conduct messages to and from the brain and cord, form a complete system among the tissues, somewhat

similar to that of the blood-vessels. The brain has also control over involuntary muscles and movements, affecting the heart and circulation, respiration, and the processes of digestion.

The Senses include besides the five faculties of *sight, hearing, touch, taste* and *smell,* the senses of *heat* and *cold,* of *pain* and of *muscular* activity. The organs of sense contain specially modified cells, e.g. in the skin (touch-corpuscles), in the tongue (taste-buds), in the retina (the layer of rods and cones), which are connected up by means of fine processes and nerve fibres with an appropriate central group of cells in the brain.*

5. The Brain

The brain is made up of nerve cells which are linked together and connected with one another by means of nerve processes and fibres, and it is these nerve fibres which form the paths of communication between the different parts of the brain. The functional activity of the brain depends largely upon the facilities for communication between the nerve cells; and one of the objects of education is to encourage their effective correlation and co-ordination. As the brain develops, the linking-up of the nerve cells becomes correspondingly closer and more complex. Nerve cells are grouped together in different masses of brain tissue, which are known as "centres," and these centres govern the functions and actions of all parts of the body. No part of the muscular system is unrepresented in the brain, and communication between the muscles and the brain is established by means of afferent and efferent nerves. The communication between the brain and the muscular system is thus extremely intimate, and co-ordinated movements of all kinds depend on the integrity of this harmony. In the young child many of the centres of the brain are undeveloped, and many nerve cells contained in them have not become functionally active. As growth continues new movements and activities are constantly attempted and the "coarse" massive movements are supplemented by finer and more delicate ones; all these stimulate further development of the centres of control. By means of these motor activities the brain cells of these centres are subject to constant growth and development, which does not end with childhood. Thus, normal physiological stimulation of the nerve cells is good and promotes the general as well as the local development of the brain. It is only when the stimulation is excessive or premature that harm may be done. The steady and balanced growth and working of the brain should be the aim, for the brain is the regulating centre of the whole body.

* The teacher is recommended to consult Huxley's *Lessons in Elementary Physiology* (Macmillan) for further study of the structure and function of the body; revision by Professor J. Barcroft, reprinted 1929, price 6*s*.

6. School Fatigue

In Chapter IV the importance of lack of sufficient sleep as a cause alike of malnutrition, lassitude, and mental fatigue is emphasised. Apart from this primary cause, mental fatigue in school children, whether in the classroom or elsewhere, may be due to three or four causes. (i) Some of it is really physical fatigue, due to mild internal poisoning by the waste-products of the body itself: such bodily poisons may accumulate during sedentary tasks, and can be worked off by a little gentle exercise in the fresh air or sometimes by a few quick exercises in the classroom. Fatigue, or lassitude may be due to lack of food, unsuitable food, indigestion, constipation, lack of exercise or fresh air. (ii) Some of the restlessness, inattention, and slow or inaccurate work, is a sort of instinctive self-defence, prompted by minor sensations of discomfort and cramp, e.g. in the postural muscles of the trunk (as after prolonged sitting), or in the small muscles of the hand (as in writing), or in those of the eye (as in reading). (iii) Most of it is probably due to mere boredom—that is, to lack of continued interest in the work itself, and to constant repression of other interests or instincts more natural to the child; change the subject at which the child is working, change the method of teaching or the teacher, introduce some new incentive or tap some fresh source of enthusiasm, and at once all symptoms of so-called fatigue may completely disappear. (iv). Something like genuine mental exhaustion—exhaustion of the brain itself, or of its nerves and nerve-cells—may occur, but it is extremely hard to demonstrate, particularly in the healthy boy or girl up to the age of about 14. What is called over-pressure or over-work is seldom due to sheer excess of brain activity. It is due not so much to intellectual exhaustion as to emotional strain, arising perhaps from excessive anxiety connected with the work itself (e.g. fear of not passing an examination), or perhaps from secret worries about more or less irrelevant conditions at home (e.g. petty domestic crises). It is commonest in delicate children with mild but chronic physical ailments, whose weakness is further aggravated by lack of exercise, sunshine, and fresh air. Much the same is true of the " fatigue " of older people.

The teacher should be on the look-out for children who seem tired and present a jaded appearance. This may be due to lack of sleep as the result of crowded conditions at home. In localities where the Public Library Authority has organised a children's library room, pupils whose home circumstances are unfavourable to study or quiet recreation should be encouraged to make full use of it.

7. The Common Ailments of Children

It is important that the earliest signs of disease should be discovered and dealt with in children of all ages, and the teacher can help considerably by bearing in mind the common *ailments* from which children may suffer. These are:—(*a*) Undue fatigue, lassitude, malnutrition, headaches, paleness. (*b*) Common affections of the skin, e.g. sores, impetigo, ringworm, scabies, chilblains. (*c*) Decayed teeth. (*d*) Mouth-breathing, septic tonsils and enlarged glands. (*e*) Defective speech and stammering. (*f*) Common diseases of the eye, imperfect vision, squint. (*g*) Defective hearing, and discharging ears. (*h*) Frequent colds and coughs. (*i*) Deformities, e.g. spinal curvature, flat foot, rickets. Such conditions should be reported by the school teacher to the school doctor or school nurse. The teacher should be alive to the importance of detecting the first signs of the common infectious diseases in his pupils. Vomiting or sore throat are symptoms which may sometimes herald serious illness. It should be remembered, too, that " growing pains " may be the first signs of rheumatism, and that deterioration in handwriting may be the first symptom of chorea (or St. Vitus' dance).

In addition to the treatment of disease, the school special services provide for abnormal children and the Local Education Authorities have statutory powers for dealing with them.

These abnormal children may be classified in four groups: (i) Physically defective (cripples, tuberculous, delicate children). (ii) Blind and deaf (including " partially sighted " and " partially deaf "). (iii) Mentally defective. (iv) Epileptic. In addition to the provision for mentally defective children in Special Schools, special provision is made in an increasing number of the ordinary Public Elementary Schools for dull children who are mentally sub-normal and for backward children who are retarded by bad environment or nutural or educational neglect.

CHAPTER IV

CONDITIONS OF BODILY HEALTH

1. Fresh Air and Sunlight

(*a*) Value and Need of Fresh Air

Other conditions being equal, life spent in the open air and sunshine makes stronger men and women than life lived indoors. In spite of the many advantages of the town dweller in the direction of higher wages, good sanitation, and better housing, he often does not live so long as the dweller in the country. Many men and women of uncivilised peoples have a fine physique. Their diet is of the simplest and they have few amenities of civilisation, but they live a natural life in the open air and sunlight. In brief, fresh air conveys oxygen to the body and blood, increases metabolism, and stimulates the appetite.

(*b*) Physical Properties of Fresh Air

It is the oxygen and the physical properties and purity of fresh air that are valuable. For its proper functioning the skin must be continually cooled, and this does not take place if the body is surrounded by an over-heated, moist, stagnant atmosphere, the results of which are that the tone and vitality are greatly decreased, pallor is increased, the muscles become flabby, and resistance to disease is lowered. Movement of air is vitally necessary. From the point of view of health, changes in the chemical composition of air are of less importance than those associated with its physical properties. In freely moving pure air there is considerably less likelihood of infection.

(*c*) Supply of Oxygen to the Cells of the Body

The living processes carried on in every cell of the body require oxygen. In very simple forms of life, such as the amoeba, which consists of only one cell, there is no need for oxygen to be carried to it as the cell simply takes what it needs from the water in which it is immersed. In some higher forms of life, e.g. insects, whose bodies are built up of a large number of cells most of which are beneath the surface and so unable to absorb oxygen directly, there are special contrivances through which the air can pass, and thus reach these deeper cells. In higher animals and in man the air is drawn into the lungs and oxygen enters the blood (through the tiny blood vessels spread all over the lung) by which it is carried throughout the body. In this way oxygen is brought into contact with each individual cell of which the body is made up.

The same living processes which require each cell of the body to take up oxygen produce also a waste gaseous substance to be cast out, carbon dioxide. The amoeba simply discharges it into the surrounding water, but the millions of cells in the human body cannot of course do this, and it is accordingly carried to the lungs by the blood stream just as the oxygen was brought from the lungs to the cell. Reaching the lungs it passes into the air passages and is breathed out.

(*d*) Need for Ventilation

Where many people are in a room together the air is continually being robbed of oxygen with each breath taken in, while at the same time carbon dioxide is being added to it with each breath breathed out. However, even in an ill-ventilated room, there is always plenty of oxygen left and very seldom an additional quantity of carbon dioxide sufficient to act as a poison. As stated above, it is the stagnant over-heated air, loaded with moisture, organic impurity and germs, that produces the ill effects, not the diminished amount of oxygen or the increased carbon dioxide.

It is now clear why we have to ventilate a room and what our arrangements for ventilation must be if it is to be effective. Briefly stated, these arrangements must (i) allow for ample admission of fresh air; (ii) keep the air moving in the room by *cross* ventilation, inlet and outlet being opposite to each other or some other device to ensure a *through current of air;* (iii) maintain a proper temperature; (iv) ensure that the moisture is neither too much nor too little; (v) remove the disagreeable odours which arise when people are crowded together; and (vi) prevent pollution of the air by dust and germs. In the school, the aim should be to secure in each class-room fresh, clean, cool, moving air.

(*e*) Temperature of a Room

The hotter we think it necessary to keep a room, the more difficult does it become to ventilate it, partly because the cold incoming air lowers the temperature and partly because of the draughts produced. Formerly, class-rooms were kept warmer than is now thought necessary or desirable. In some countries, a temperature of 65° F. or even higher is the rule; in this country 60°-62° F. is considered to be the maximum necessary, but many people think that it is more healthy for the child to work in a temperature of between 56° F. and 60° F.

(*f*) Process of Breathing

As explained above, the purpose of breathing is to introduce fresh air and oxygen into, and expel carbon dioxide and used air from, the body. The wind-pipe divides into two branches.

one for the right lung, the other for the left. These branches subdivide until they form an intricate ramification of smaller tubes, which terminate in minute air sacs. Small blood vessels surround these air sacs and oxygen can readily pass from them into the blood stream. Similarly the blood stream delivers up its carbon dioxide. The air is drawn into the lungs and again forced out of them by the expansion and contraction of the chest wall.

Breathing should always be through the nose (except during violent exercise); this is necessary in order that the air may be properly filtered and dust particles removed, and that it may be warmed before reaching the lungs. Mouth breathing is a common habit among young children. It may sometimes be due to adenoids, but more frequently to the continuation of a habit formed as the result of the nose becoming blocked from nasal catarrh and from failure to keep the air passages properly free by the use of the handkerchief. Children should be encouraged to use the handkerchief regularly and in a proper manner. The nose passage must always be kept clean, clear and free from discharge. It is the gate of entry for air to the lungs.

It is important also that breathing should be deep. It is not voluntary deep breathing that is needed but the involuntary deep breathing induced by vigorous out-of-doors exercise. Only in this way can the lungs be properly expanded and the minute air sacs distended in the most remote parts of the lung. Tuberculosis is more likely to secure a hold in any part of the lung which is not thus adequately ventilated. Proper breathing will also depend on a child's habitual posture. Children who bend over their work, or loll about and carry themselves badly, will not exercise their lungs so well as children who hold themselves erect and are generally alert and vigorous.

(*g*) Necessity for Sunlight

The beneficial influence of sunlight in relation to health has only comparatively recently been scientifically explained. We have sometimes been apt to fear it rather than to welcome it; to think of the danger of sunstroke and of the power of the sun to fade carpets and curtains rather than to recognise that it gives health and vigour to the body, and destroys germs of disease. Provided that there is proper protection of the head and nape of the neck from a very hot sun, the more children play in the sunlight and the more we let sunlight into our rooms at home and at school the better. In our large towns much of the sun's energy is cut off, only about one-quarter of it getting through the atmosphere as compared with

one-half at the seaside and three-quarters on mountain tops. Some of the beneficent influence of sunlight is due to invisible rays. A beam of sunlight when passed through a prism or through the drops of a shower of rain, is divided up into its constituent parts and we see the seven colours of which sunlight is composed (as in the rainbow), starting with red at one side and ending with violet at the other. The invisible special health-giving rays are found beyond the violet rays and are called ultra-violet rays. Unfortunately these rays are filtered out when sunlight passes through ordinary window glass, and this is one of the reasons why being indoors is not so health-giving as being out of doors. Advantage is taken of the health-giving properties of sunlight, especially of these ultra-violet rays, to treat debility and other ailments. Its healing properties are utilised in the treatment of children suffering from such diseases as rickets and tuberculosis of the skin, bones and joints by *heliotherapy* in the open air, or artificially by the *arc lamp*.

(*h*) Injury done by Smoke

The harm done by the smoke pall which hangs continually over our large cities, and by the fogs which occur with greater or less frequency, blocking out the sunlight from our homes, schools and streets, is due partly to the acids, carbon and tarry matters in the smoke which injure vegetation, corrode buildings, make houses dirty, or choke the lungs. Also, we tend to keep our windows shut to prevent unclean atmosphere and dirt coming in. In some large industrial towns from 500 to 700 tons of sooty matter charged with chemical impurities are deposited every year upon each square mile, while in some seaside and country towns the deposit may be as low as one-seventh of this, and is, moreover, less injurious. Atmospheric smoke obstructs the actinic rays of the sun more in the town than in the country or the seaside.

(*i*) Principles of the Open-air School

Open-air schools have these important functions. They receive the physically defective or delicate child who, for the time being, is unfit for education side by side with healthy school fellows; they cure or ameliorate the child's ill health, at the same time providing education suitable to his individual capacity; in the majority of cases they restore the child to normal health and enable him to be transferred back to the public elementary school, there to continue his education.

Open-air schools are either residential or day schools. In either case they should be constructed on an ample and suitable site so that the education not only includes instruction suitable

to the child's condition and surroundings and medical supervision and treatment, but also teaches a way of life. Open-air school education thus has seven characteristic features:—

(*a*) life as far as possible in fresh air and sunlight;

(*b*) a proper and sufficient diet (it is usual to provide three meals daily);

(*c*) one hour's mid-day rest lying down in the open air when fine, or in an open-air rest shed when wet;

(*d*) the hygienic way of life, including shower baths and organised physical exercises;

(*e*) special educational methods with much time devoted to practical subjects, nature study, gardening and manual work;

(*f*) individual attention to remedy the backwardness which so often accompanies debility;

(*g*) careful medical and nursing supervision.

Such a regime and education are of the highest value in the cure of debility, malnutrition and many other conditions, and in teaching personal hygiene, but the open-air school has also been a means of educating the public in the essentials of healthy living, and it has had a very beneficial effect on the planning of class and other rooms in ordinary schools.

2. Cleanliness

(*a*) Basis of all Healthful Living

Habitual disregard of cleanliness, whether in the individual or his surroundings, is responsible for much that is disagreeable and of social disadvantage. Uncleanliness is the cause, directly or indirectly, of many ailments and diseases. It is, unfortunately, true that many parents have an altogether inadequate conception of cleanliness, though it is only fair to say that too often the character of their surroundings and the insufficient facilities for maintaining cleanliness raise almost insuperable difficulties in maintaining a high standard. It falls to the school teachers, therefore, to take upon themselves much of the responsibility for securing personal cleanliness in the children. It is necessary to inculcate in children a love of cleanliness through its habitual practice, and to train them to understand its significance in the life of the individual and the community. The child should not come to school with dirty face, hands or body.

Habitual uncleanliness must be distinguished from occasional uncleanliness. All healthy boys and girls will get themselves dirty, and the healthier the child and the more active its life in work and play the more likely it is to become dirty at times; but occasional dirt on an habitually clean body can easily be removed.

(*b*) Evils of Uncleanliness

Uncleanliness of the body hinders its proper functioning, aggravates skin disease, and may complicate a slight scratch, cut or blister with inflammation and even blood poisoning. It may also beget a characteristic and unpleasant smell in the schoolroom or bedroom. Dirty hands or nails may convey germs to the mouth or to food. Uncleanliness of the head is not only disagreeable, but it spoils the character of the hair and often gives rise to sores from which the glands of the neck may become affected. Uncleanliness of the nose and blocking of the nasal passages may contribute to mouth breathing, nasal catarrh or even adenoids. Uncleanliness of the eyelids may cause their inflammation, and produce or aggravate the condition of sore eyelids. Uncleanliness of the ears may lead to ear-ache and inflammation and increase the seriousness of discharge from the ear. Uncleanliness of the teeth produces decay, which may give rise to abscesses; harm may result through interference with proper biting of the food, by the swallowing of septic matter from the gums and teeth, and by the absorption of poisons, all of which give rise to ill-health and disease. Uncleanliness or constipation of the bowel is the root of much evil.

(*c*) Social Effects of Uncleanliness

The teacher would refer to the following points: the unpleasantness and risk to other people of uncleanliness; fleas and lice flourish in dirty surroundings; refuse left lying about forms a breeding place for flies, and these carry germ-laden dirt which they deposit on food and particularly in milk; stagnant water breeds mosquitoes; polluted water is a source of disease. We have already seen that the uncleanliness caused by our coal fires and factory chimneys poisons and pollutes the atmosphere; windows in houses, schools and workshops get covered with dirt and dust which tend to keep out the light and the sun's rays; dirty houses retain infection. Sore throats, catarrhal conditions and consumption are more frequently met with in factories where dusty conditions prevail.

3. Exercise and Rest

(*a*) Value of General Exercise

One of the primary needs of growing children is the exercise of the larger muscles of the body. Active forms of exercise tends to strengthen all the muscles (including the heart), develop the brain, deepen and increase the rate of respiration, induce the skin to perspire, and secure and maintain equilibrium. They are essential if proper benefit is to be derived from food, if the digestive organs and the bowels are to be kept in good working order, if proper excretion through the

kidneys, skin, and lungs is to be ensured, and if harmonious control of the body is to develop. Hence the importance of the boy and girl actually playing games and not merely watching them; and of learning to swim, taking part in school sports, organised games, and active forms of recreation such as country and other dances. Too many children at present never acquire the *habit* of active exercise.

(*b*) Recreation

Recreation other than that obtained by vigorous exercise, e.g. walks, reading of books, visits to museums, art galleries or the Zoo, concerts, cinema halls, etc., may have an important influence on health, beneficial or otherwise, according to circumstances. It should be remembered that, other things being equal, *enjoyment* is wholesome, and that for this reason children should be encouraged to use such forms of recreation as they prefer, provided that these are harmless to body, mind or spirit, and that vigorous exercises in the open air are not neglected. They should at the same time be encouraged to cultivate a taste for books, games and amusements.

(*c*) Need for Organised Physical Exercises

Active forms of free exercise of the kind referred to above should come first in the child's physical training, but they need supplementing by the more regulated and systematic forms of physical exercises which play a special part in the harmonious training of the body as a whole. Organised exercise leads to improvement in the general physique, to the prevention or correction of faulty attitudes of the body, to the acquirement and development of habits of self-control, discipline and quick response. A large though varying proportion of school children show signs of malposture (slight curvature of the spine, flat-foot, round shoulders, poking head, etc.), which may be due to bad habits in standing or sitting, to unsuitable school furniture, to fatigue and debility, or to actual disease. The application of corrective exercises is the appropriate method of treatment.

Systematic physical exercises are a valuable safeguard against danger from strain arising in the course of the more violent forms of exercise, such as running or swimming; they are of particular value to the less robust children who may need to be warned against undue strain, especially in competition with their fellows.*

* For a fuller statement of the advantages and limitations of organised exercise, games, dancing and swimming, the Board's Syllabus of Physical Training for Schools, 1933, should be consulted (H.M. Stationery Office, price 3s.).

(*d*) Good Habits of Rest and Sleep

Many children need to be encouraged to acquire good habits of rest and sleep. The difficulties in the way of children getting a long night's rest may be very great in some households, but children can form the habit of sleeping through much disturbance and noise, though it should be borne in mind that sleep in quiet surroundings is more beneficial. One of the most important precepts of Health Education to be ingrained in the child's consciousness is that "early to bed and a long night's rest" is one of the essentials of good bodily and mental growth and fitness. Both by direct influence upon the child and through co-operation with the parents the teacher should endeavour to secure that children up to twelve years of age have at least twelve hours in bed every night, the younger children as much as fourteen hours; older boys and girls need at least ten hours. The teacher should help the child to acquire the habit of repose, and tranquility is necessary to attainment of physical and mental health. Remember that in the ancient world it was taught that "healthy sleep cometh of moderate eating."*

4. Warmth and Clothing

(*a*) Body Heat

Body heat may be briefly explained to the children. It can be illustrated by considering how the heat of the body is created and conserved (by the living body. food, exercise, clothing, etc.), and lost (by evaporation and wet clothing), the distinction between cold and warm-blooded animals, the changing summer and winter coats of animals, the practice of hibernation and migration, the superiority of warm-blooded animals and the torpidity of cold, etc. From this the child will understand something of the purpose of clothing.

(*b*) Wearing of Suitable Clothing

Much can be done by the teacher to train children to wear clothing suitable both in quantity and quality. By means of needlework, laundry and domestic lessons in school, by the force of example of other children, and by getting into direct touch with the parents, the unsuitable and unhygienic clothing worn by many children can be changed into clothing that is

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* In a recent pamphlet the London County Council recommended the following as *minima*:—

Essential hours of sleep and times to go to bed—

12 hours at 4 years	6.30 p.m.
11 to 12 hours at 5 to 7 years	7.0 p.m.
10 to 11 hours at 8 to 11 years	8.0 p.m.
9 to 10 hours at 12 to 14 years	8.0 p.m. to 9.0 p.m.

simple, clean, attractive and adapted to the season of the year. The principles and proper methods of clothing should be taught to all older children and by the making of garments a habit of suitable clothing should be acquired. Children are probably more frequently over-clothed than insufficiently clothed.

(*c*) Suitable Clothing Materials

The best materials for retaining heat are fur, wool, silk; cotton and linen conduct heat from the body, taking up moisture but not retaining it. Open meshed material should be used and the mesh should be of a character that does not shrink in washing. The reason for this kind of material is that air is trapped in the meshes and thus the material, while allowing for evaporation of moisture from the body surface, acts nevertheless as a poor conductor of heat. Flannel or wool is usually worn next to the skin in cold weather on account of this property of being a poor conductor of heat, but unless very carefully washed it tends to become hard and does not allow of the necessary air-bath around the skin. Material of cotton mesh or of a mixture of wool and cotton (or silk) is light and serviceable and suits some people as well as ordinary woollen underclothing. It is, moreover, appropriate for all seasons.

(*d*) Clothing for Boys and Girls

Clothing, particularly for girls, has become considerably more hygienic and utilitarian of recent years. Close fitting unwashable stuff dresses, boned corsets, and tight bodices are seldom used now, while stiff collars are much less common among boys than formerly. Moreover, the number of garments worn has certainly decreased. This improvement is no doubt due partly to changing fashions, partly to a more practical application of the rules of hygiene in matters of dress, and partly to increasing opportunities for physical activity both in and out of school hours.

For *Girls*, light, loose and warm garments of simple pattern are the most hygienic and in the end most economical. For example, a long vest; knickers with separate washable linings of varying thickness according to the season; a tunic form of dress, with a washable blouse, or a jersey and skirt supported from the shoulders, with a cardigan or knitted coat for extra warmth, form a suitable and comfortable dress for every-day wear. No clothing should be tight fitting and garters should not be worn.

Boys may suitably wear garments of wool or open-meshed material next the skin (in cold weather), a cotton or flannel shirt, and knickers and stockings which leave the knees bare;

braces or belts; there should be either a woollen pull-over or a jacket, or, if necessary, both. For younger boys a jersey is convenient. Tight bands or restrictive garments of any kind should be avoided.

When extra clothing is required for warmth it is important that it should be evenly distributed over the body. Knitted woollen garments are excellent and the popularity of hand knitting has made such clothing more easily procurable. There should be adequate protection from chill, and the fashion of allowing children to have a large part of the thighs and legs unprotected in cold and damp weather is not without risk.

The provision of suitable footwear is less difficult than formerly, as well-shaped boots and shoes are now obtainable at a reasonable price. It may be useful to refer to three points in connection with footwear. First, while parents are willing to provide stout football boots for boys, the need of the girls for similar thick boots in which to play field games is not always appreciated. Secondly, while it is satisfactory to find that the use of rubber-soled shoes for physical activity is becoming more general, these shoes should not be worn for long periods. Thirdly, children quickly outgrow their footwear, but the wearing of boots and shoes that are too small leads to deformity that may last for life.

(*e*) Change of Clothing

All underclothing should be changed at least once a week. Whenever clothing gets wet it should, if possible, be changed, especially socks and stockings. After severe exercise, e.g. playing football or cross-country running, the clothing should be changed and the body well rubbed down with a rough towel; if a shower or ordinary bath is available so much the better. The chilling of the body through damp clothing is a source of discomfort and loss of body heat, and may be a pre-disposing cause of illness.

5. Care of the Eyes and Ears

(*a*) Care of the Eyesight

The light of the body is the eye. The child's eye is immature and growing. It is injured by improper exercise, poor or excessive light, the use of unsuitable reading or writing materials, or prolonged and close work. Vision comes by use, by alternate exercise and rest of the eye. Scientists, artists and craftsmen have become eminent by the use of the eye and by training in the power of observation. The extreme importance of the care of the eyesight throughout life may be impressed upon children by training them in particular

habits. Thus the maximum amount of light should be allowed to come into the house; curtains should be such as can be completely drawn back to expose the whole of the window during the daytime; whenever possible the light should come from the direction to the left of the child, and in any event strong cross shadows should be avoided; school books should be of a suitable type and children should be warned against reading badly printed books at home. The undesirability of " glare " should be recognised and the risk of looking straight at the sun or any very bright light should be explained. Children should be encouraged (*a*) to report any difficulty they may find in seeing what is written on the blackboard or when reading from a book, and (*b*) to wear glasses if medically advised to do so and at the times advised. Worried looks, frowning, blinking, face-twitching, rubbing eyes, the book held too close to the eye, and headaches may be early signs of eye strain and call for attention. Short sight may be induced by allowing children to read with the book close to their eyes, e.g. when lying in bed or in other unsuitable positions. Eye strain left untreated leads to headache and nervous conditions and may affect the general health; good health will greatly aid in maintaining good eyesight. If the eye becomes inflamed, children should learn not to rub it, and that any rag or towel used to bathe or wipe their eyes should not be used by anyone else.

(*b*) **Care of the Hearing**

Children should be taught the danger of putting any foreign body into the ear and the harm that may follow a blow upon the ear. Should wax accumulate it should be left to a doctor or nurse to remove it. The seriousness of discharging ears should be emphasised and parents should be encouraged to see that children suffering from this ailment receive early, regular, and persistent treatment. The habit of quiet talking and careful listening should be cultivated. It should be remembered that there is close relation between deafness and defect or blocking of the nose or throat.

(*c*) **Examination of the Sight and Hearing**

The importance of perfect eyesight and hearing can be further impressed on the children by interesting them in the method of the examination of the vision and hearing, and this, under the instruction of the school medical officer, may well be undertaken at regular intervals as part of the ordinary school routine. Deterioration of hearing may go on for some time before it is noticed. Slight defects in sight and hearing are important, and cold in the eye, or pain in the ear, or a discharging ear should receive prompt attention. Deafness (of any degree) should be referred to the school doctor.

6. Care of the Teeth

For the teaching of this subject to be effective and practical, it should be realised, *first*, that children are not greatly interested in their teeth, and that an appeal on this ground is likely to fail, all the more because they have no direct evidence in childhood of ill-health arising from neglect of the teeth; and *secondly*, that the formation of good habits, even though the reason for them is not fully understood, is likely to be of permanent value, especially in young children. For these latter, therefore, practical demonstration accompanied by frequent inspections should constitute the chief method of inculcating care of the teeth. For older children, information may be given as to the growth and construction of teeth in early years and their dependence on constitution and dietary.

(*a*) Value of Teeth

(i) It is obvious that teeth can be beautiful in themselves, and that they are a necessary adjunct to good looks. Children readily appreciate that the pleasing effect of a smile or laugh depends partly upon the teeth. Again, it can be shown that personal appearance has a good deal to do with success in life and that young people applying for posts often succeed or fail as their appearance impresses the employer favourably or otherwise, and in this the condition of the teeth plays a part.

(ii) Health depends upon good digestion more than anything else. To ensure good digestion an efficient set of teeth is the first requirement; even one decayed and tender tooth may lead to the habit of swallowing food without proper mastication. The function of the teeth in cutting, crushing and grinding the food and mixing it with saliva is the first step, and one of the most important, in the process of digestion and the nutrition of the body, and is essential for the proper maintenance of physical strength and vigour.

(*b*) Results of Dental Decay

In order that children may realise to some extent the insidious nature of dental disease, it should be explained to them, first, that we have no means as yet of being able with certainty to prevent decay arising, however much care is exercised; secondly, that in its early stages there are no warning signals, such as pain or disfigurement; thirdly, that when decay has once started in a tooth it will almost inevitably proceed to the destruction of the tooth, and may involve the other teeth, unless steps are taken for its arrest.

There are three direct results of dental decay, and they are all practically certain to occur sooner or later.

(i) *Pain.* This is nature's warning, but is often absent in the early stages of decay, and may not occur until the tooth is irreparably damaged. It is never, therefore, safe to wait until a tooth hurts before seeking attention.

(ii) *Loss of Use.* The tenderness of a single decayed tooth may prevent the proper functioning of the entire set.

(iii) *Disfigurement.* The loss of a single front tooth may seriously impair personal appearance. In neglected mouths decay tends to involve one tooth after another, and to produce a disfigurement which may be a handicap in life.

The ultimate result of dental decay is an impairment of the general health owing partly to digestive troubles due to the inability to masticate properly, and partly to the constant swallowing of poisonous matter arising from the decay. Of the many ailments which tend to impair happiness and efficiency, such as headaches, lassitude, anaemia, and fibrositis, dental decay is certainly one of the commonest causes.

(*c*) Preservation of the Teeth

The teacher will understand that no instructions for the care of the teeth are likely to be effective until the children have grasped the fact that such care is really worth while. The first step, therefore, is to persuade the children to take an interest and a pride in their teeth.

Cleanliness of the teeth (as with cleanliness of other parts of the body) should be insisted upon not only as a health measure but as a personal and social duty. It should be pointed out to older boys and girls that it is equally important from the point of view of decency, comfort and appearance, to have clean teeth as to have a clean body or clean hair. Younger children should be taught the practice before they can appreciate the purpose. Some form of "tooth-brush drill" is desirable to attain this, preferably with actual brushes. The necessary up-and-down and side-to-side movements (inside the teeth as well as outside) should be practised, and children should be encouraged to look at their own and one another's teeth. A small tooth-brush is to be preferred to a large one, and the teeth should be cleaned daily, in the morning and at night. The cleaning at night is the more important, for it is during the hours of sleep that the injurious decay-producing agencies are active and the natural methods of cleansing are in abeyance. No food of any sort at all should be taken after

the teeth are cleaned at night. The tooth-brush itself should be kept clean. More harm than good may be done by using a dirty tooth-brush.

Natural methods of cleansing teeth by the chewing of fruit, hard crusts, etc., and the rinsing of the mouth with water after a meal should be encouraged. It should be explained to the child that many kinds of food, especially those of a starchy or sugary nature, are apt to leave a thin film on the teeth, which may form the starting point for the germs of disease. This is the reason why such articles as biscuits or sweets should not be taken after the teeth have been cleaned at night. A raw apple is an excellent cleanser of the teeth, gums and tongue.

Children should be taught that they may have it in their power to strengthen their teeth to resist decay, by getting all the sunlight and fresh air that is possible, by giving their jaws vigorous exercise on hard and fibrous foods, and by taking plenty of milk, butter, eggs and fresh green vegetables.

Finally, they should be brought to understand the privilege and value of dental inspection and treatment; that the dentist with his skill and experience can detect the earliest beginnings of decay, and can arrest it without pain; and that children who go regularly every year for dental inspection and follow the dentist's advice will probably, when they leave school, have a complete and sound set of teeth.

CHAPTER V

BIOLOGY AND HEALTH

1. Elementary Science as the Groundwork

The extent to which Health Education arises out of the teaching of elementary science must necessarily depend upon the character and amount of the science teaching, which vary considerably from school to school. Since, however, such science as may be taught to older children usually comprises nature study and physical geography, together with elementary physics and chemistry and in some schools very simple biology, it is clear that there must be many opportunities for making these lessons the groundwork of health teaching. Thus, when the properties of air and its constituent gases are being studied, demonstrations can be included to show the necessity of air (i.e., of the oxygen it contains) for combustion, and for the life of plants and animals. Considerations of " good " and " bad " air, and its diffusion and pressure, will naturally arise and the relation of these to health. Similarly, the study of the chemical and physical properties of water will have little interest to most children unless it is related to the many associations of water with health. The supply of domestic water, its origin and the methods taken for its purification before it reaches the tap afford an abundant field for science teaching of a real rather than an academic type. With these lessons may be linked up the study of such things as traps and rainwater gullies, the heating apparatus of the school, the cleaning out of cisterns, the repairing of taps and ball valves, etc. Again, the study of light, heat, sound, radiation, and the elements of chemistry and biology furnish a basis for instruction in hygiene of a living and practical kind.

2. Value of the Study of Biology

Biological knowledge is necessary for the right understanding of many matters concerned with health, including foods, their composition and origin and the principles underlying the provision of suitable diets, while much can be learnt from the study of animal life when considering the effect on the growing child of fresh air and sunlight, exercise, warmth and rest. The study of the life history of plants and animals among their lowest forms is necessary for the prevention of many kinds of disease, since it is upon these organisms that such diseases largely depend. Moreover, modern psychology is based upon biology, and behaviour in man depends largely upon instincts which have behind them a long line of ascent. It should be remembered that for the purpose of Health Education it is not necessary to have a special knowledge of different branches of

science. The main study is that of function rather than of form, the way plants and animals act rather than how in detail they are built up. If, combined with a sound even though elementary training, nature is watched in her manifold workings, illustrations will be found to abound bearing on the fundamental laws and requirements of healthy living. " In view of the intimate relations between Man and the rest of the living world, and between the forces exerted by the latter and all other forces, I can see," wrote Huxley in 1863, " no excuse for doubting that *all are co-ordinated terms of Nature's great progression,* from the formless to the formed, from the inorganic to the organic, from blind force to conscious intellect and will."

While it is true that the child's first interest is in itself, in the processes of its own body, it is equally true that if we want the older boy or girl to take an intelligent interest in digestive, circulatory, excretory, reproductive and other life processes, we must introduce them in their primitive forms in suitable types of the lower animals. A simple explanation should first be given of the cell and its functions, and then of a collection of cells, as bricks form a house. When this is grasped there will follow later the understanding of the differentiation of functions among cells as life forms evolve and become more complex, and, later still, of the formation of distinct and separate organs, and finally of the association of these into systems of the body. For the understanding of the working of the human body the two methods may well be employed together, the pupil's interest being secured in the structure and functioning of his own body and also in that of lower forms of life. To restrict instruction to the human body tends to lead, as experience has often shown, to what one may call spurious knowledge, a matter largely of words, notions and diagrams, and possibly even a " medical " bias. The two methods together lay a foundation of intelligent interest in health and its maintenance.

3. Nature and Nurture

It is important to remember that the form (morphology) of man's body and its functions (physiology) form two subdivisions of the one larger science of Biology, the study of life as a whole. Man is a part of the universe, of the community of all things, and he is therefore subject to the great natural laws. He is one with the plants and animals. Men differ from animals, and from each other, owing to their *nature* and the upbringing, or *nurture,* to which that nature has been subjected. The nature of man is what he inherits from his ancestry of man and animals; *heredity* and variation together have made him the species he is.

Practical applications of the knowledge of heredity can be made of much interest to children. Thus in a district in America a variety of wheat was found strong enough to withstand storms and with a head that did not burst as the grain ripened, but unfortunately it would not withstand a severe frost. By a series of experiments a strain was produced in which the desired qualities were preserved, and the undesirable eliminated. Scientific breeding has led to securing immunity from disease. A good example of this is the production of potatoes free from potato disease and of cattle free from the disease known as Texas Fever. Other practical applications include the production of varieties of plants and fruits, the increasing of eggs in fowls and milk in cows, or the breeding of rabbits, dogs, horses, and cattle, the value of which is enhanced by "pedigree." Children may learn that good and bad qualities are both passed on from generation to generation, physical, mental and moral. Much can be done to encourage and make habitual the good qualities and discourage the bad ones.

Nurture is the impress upon man's nature of all the factors and influences which affect him, principally what we call his *environment*. This moulds him or he adapts himself to it; there is mutual reaction. He acquires skill or habits in order to survive, characteristics which though not usually inherited are continued by education. In practice, it is expedient that the opening minds of children should be directed both to the value of the principles and methods of nurture, and to what they owe to the past as a debt, and to the future as an obligation. Every advantage and privilege of their lives is a debt they owe to the children who follow them.

4. Life in its Lowest Forms

Plant and animal life have much in common, very different though they appear in outer form. When we come to the simplest forms of animal and plant life they are indistinguishable, the one from the other. The basis of the structure in each is the cell, and the lowest form of plant life and animal life consists of one cell only. As higher forms develop groups of cells become differentiated in form and function, and tissues and organisms peculiar to animals and plants respectively result.

Both plants and animals function similarly. Each *grows* up, obtaining, digesting and assimilating food; each *breathes* through leaves in the case of higher plants and through lungs in that of higher animals; each *excretes;* each *moves,* for even plants seek the light and twine their stems round the support; each *feels;* each can *reproduce* its kind.

5. Plants in Relation to Health

Many life processes can be studied in plants; the fact that on plants simple experiments can be carried out in regard to growth in general greatly increases their value for this purpose. Plants and fruits may be studied also from the point of view of food supply, and gardening may be made a valuable ally to health education, the children learning to be interested in the cultivation of vegetables and to acquire the habit of eating vegetables and fruits of all kinds. Then there is the use we make of plants for clothing (cotton and flax); for warmth (coal, wood and peat); for drugs in time of sickness (quinine from cinchona bark, opium, belladonna, aconite, aloes, rhubarb, digitalis from the common foxglove, gum arabic, camphor); for condiments (mustard, pepper, ginger, cinnamon, nutmeg, olives and cloves). The children will learn something also of the plants which are harmful to man such as poisonous plants and berries.

6. Useful and Harmful Bacteria

The bacteria in their numerous forms and countless myriads are the friends or foes of man. Among the friendly bacteria are the natural scavengers which act upon sewage and convert it into an odourless and useful fertiliser; there are various species that aid in the nitrification of soils; some assist in the ripening of cream, and production of butter and cheese; others are used in the retting, tanning and pulping industries, others abound in the large intestine of man and help to transform and render harmless the products of digestion which might otherwise lead to the formation of poisonous matter likely to get absorbed into the body. But there are also harmful bacteria which cause, as we have seen, such diseases as tuberculosis, the infective diseases, septic processes and the decay of the teeth.

7. Animals in Relation to Health

Many are the health lessons which can be learnt from the study of animals. We may study their teeth and reflect on the reasons for their perfection; their glossy skins and hair which result from perfect health, and in the case of such an animal as the cat from careful attention to cleaning; their poise, gracefulness and enjoyment of play, so well seen in the case of young animals and some birds, due to the health of body arising from their natural life; their migration and hibernation; their obedience to, and compliance with, natural law. We have seen the use that is made of plants. We owe a similar debt to animals for the clothing they provide—wool, silk, leather and fur; for the fats they furnish which, when

treated with alkali solutions, are formed into soaps; for the bristles they supply for making brushes to keep our bodies, hair and clothes clean; and for all the meat foods. It should be remembered however, that household pets may be injurious to health. They may bite, convey parasites or infection. and introduce dust and dirt to the home. Dogs, cats, rabbits, birds, etc., in or about a house should be cared for and kept clean.

8. Spread of Disease by Vermin

Thus animals, like plants, may be harmful to health as well as beneficial. There is for instance the common house-fly which is responsible for much disease. It is bred on manure heaps and other refuse and the sticky hairs which cover its feet pick up dirt laden with germs and carry them wherever it goes, into the milk jug or on the food. It excretes minute deposits of filth and these it also leaves on the food it crawls over. It is responsible in this way for much of the epidemic diarrhoea among babies, and may even transmit such diseases as cholera and typhoid fever. Fleas and lice cause irritation and lower the general health; they are agents also in the spreading of disease, for instance the trench fever of the Great War and the oriental plague (which is spread by rat fleas). The parasitic worms (hook-worm and filaria) are another example. There are also the protozoa which are responsible for such diseases as malaria, yellow fever and dysentery. In the case of malaria these protozoa are carried in the mosquito which, when it bites a person suffering from malaria, sucks up a minute drop of blood containing the protozoa which develop further in the body of the mosquito and may be then injected into the body of the next person whom the mosquito bites.

It is important that everything possible should be done to get rid of these disease-bringing animals. Thus, the number of flies can be diminished by trapping and killing, and by ensuring that no refuse or manure heaps are left lying about near dwellings. Much more could be done in this country by covering food both in houses and shops to protect it from being soiled by flies. It is most important to prevent the nesting of rats which should be exterminated whenever found, especially on board ship. Something has been done in many countries to banish mosquitos by getting rid of their breeding grounds, namely swamps and stagnant water. Whenever possible these are drained; in other cases spraying the surface of the water with paraffin prevents the mosquito from breeding.*

* *See* page 97.

CHAPTER VI

MOTHERCRAFT AND INFANT CARE
(*For Older Girls*)

1. Mothercraft and Health Education

Instruction in mothercraft may be looked upon as an important aspect of Health Education. The suggestion that instruction in Infant Management and Mothercraft should be given to elder girls in Public Elementary Schools was put forward as long ago as 1910. It was recognised at the time that its successful introduction into any school must be dependent upon its careful handling by a teacher who should be not only experienced but interested. Since that time the importance of infant and child welfare has become a matter of common knowledge. Infant Welfare Centres are to be found in all parts of the country, and specially trained nurses have been appointed to visit homes to advise mothers in practical matters of infant hygiene.

The key note of the social health service which has thus come into being is education and training—the education of the mother in infant care, thus equipping her to look after her own child in such a way as to keep it in good health and to prevent unnecessary illness. It is to this practical education with the consequent improvement in the standard of mothercraft all over the country and particularly among working-class mothers, that the reduction in the death rate among young infants may be largely attributed. Thus, the teaching of Mothercraft to schoolgirls is not merely an additional " subject " which must be fitted into a curriculum already full, but it is the beginning of that education in care and management of little children which has achieved so much in the national campaign for the prevention of infant and maternal mortality.

The object of educating children is to equip them for the duties and responsibilities of life, and if a girl leaves school ignorant of one of the most important duties which may subsequently devolve upon her, our system of education can hardly be said to have fulfilled its aim. It may be thought that girls at the age of 12 to 14 years are too young to benefit by this teaching and that it could be given more appropriately at a later age. Unfortunately, the opportunity for instruction later in life—before marriage, immediately after marriage, or when the mother is expecting a baby—may not arise. It is difficult to collect girls together when they have left school in the way in which we can find them in the classrooms in the Elementary and Secondary Schools. The great majority of the mothers in this country pass through the Elementary

Schools and advantage should be taken during school life to teach them a subject which is a vital one both for the individual and the State. Another reason for dealing with the subject at this age is that many of the older girls in the Elementary Schools have to assist at home in the nursing and care of younger members of the family, and any instruction given at school in the feeding, clothing and care of the baby and younger children could forthwith be put into practice at home.

The training of all schoolgirls from the age of 12 to 14 in subjects of a practical nature which will help them in later life to make their own homes comfortable and healthy, and give them some real understanding of the elements of infant and child management, would have effects which can scarcely be exaggerated.

2. The Infant Welfare Movement

Of late years, and particularly since the passing of the Maternity and Child Welfare Act in 1918 which gave wide powers to Local Authorities to put into operation schemes for the welfare of mothers and little children, arrangements have been made in all areas for the supervision of the health of infants and of children below school age.

This supervision is generally carried out in two ways: first, by means of Health Visitors, and, secondly, through Infant Welfare Centres. Health Visitors are employed under the direction of the Medical Officer of Health to visit newly born infants and advise their mothers in matters of infant care and domestic hygiene. They subsequently pay periodical visits to the home to ascertain the physical progress made by the child until it goes to school. At the same time the mother is invited to take the baby regularly to an Infant Welfare Centre where she will be advised by a doctor how to keep her baby well, and will have opportunities of learning "Mothercraft" in all its aspects, through personal and collective teaching.

As a result of increased attention to public health and of the special efforts made on behalf of infant welfare, the infant mortality rate (that is, the number of deaths under twelve months of age per thousand babies born) has fallen in England and Wales from 156 per thousand in the quinquennium 1896-1900 to 68 per thousand in the quinquennium 1926-1930. This extremely satisfactory reduction in the death rate, which has been described as one of the greatest triumphs of the Public Health Service, not only means that many lives are saved which in former years would have been lost, but also that the health of the surviving children is better

because the conditions which killed some infants, maimed many others, and, as these conditions are eliminated, the risk of injury diminishes too.

The reduction in infant mortality is no doubt due to the combined action of various factors, but there can be no question that one of the weapons which has been most effective in this campaign is *the education of the mother*. The healthy development of the baby and little child is mainly dependent upon the care and intelligence of the mother, upon her knowledge and good sense, upon her willingness to learn and to take advantage of such opportunities for advice and help as are available; in short, upon good mothering. No one can compel the mother to accept advice. She can ignore the Infant Welfare Centre and shut her door against the Health Visitor. The whole of the Infant Welfare Movement, therefore, has been directed primarily towards persuading her to learn how to keep her baby well, rather than towards attempting to look after the baby for her by relieving her of responsibility or by treating it when it is ailing.

3. Need for Mothercraft Teaching in the School

It is mainly in the school or class for older girls, whether in the Senior Girls' School or in the Girls' Secondary School, that the foundation for this instruction can, and should be laid.

This is the only time when we can make sure that a girl shall have some teaching in mothercraft. Once she has left school she may perhaps attend classes, but she is far more likely to have no encouragement or even opportunity to learn about infant care until after she has a baby of her own. At school the subject can be introduced in a perfectly natural way without arousing self-consciousness or embarrassment. Many of the elder girls attending Elementary Schools have to "mother" young brothers and sisters, and are well accustomed to handling babies, so that the practice of mothercraft is a matter of every-day familiarity and needs only to be directed into right channels. Although the instruction which can be given to school girls is necessarily limited and is given from the point of view of an elder sister rather than of a mother, the subject is one of living practical interest and the girls are therefore likely to remember enough of what they learn to render them, when they marry, anxious to learn more and ready to welcome assistance from the Maternity and Child Welfare staff of the Local Authority.

It is not always easy to obtain just the right teacher to take classes in Mothercraft—one who has knowledge, enthusiasm, and the necessary experience. Many young teachers of House-

craft do, however, make a brave attempt to do justice to this subject, which figures in their syllabuses under various names, such as Mothercraft, Infant Welfare, or Baby Care. Almost every Housecraft Course, in fact, includes one or two lessons on the Care of the Baby, and, where suitable equipment is available, may include as many as six lessons. In these, attempts are made to acquaint the girls, before they leave school with the sources from which help may be obtained, such as the Infant Welfare Centres.

The teaching of the subject of Infant Feeding is rightly receiving less attention to-day than it did in the past, because teachers fear that such instruction is apt to have the undesirable effect of laying stress upon some alternative to natural feeding.

Since it is the " toddler " rather than the very young baby that is more likely to fall to the care of an older sister, schools are well-advised in devoting lessons to the feeding and clothing, the amusements and occupations and the general welfare, of a young child just out of the stage of an " infant in arms."

4. Character of the School Course

Connection with school health programme.—The teaching should be a normal development of the school programme of Health Education, and should be given in the classroom. Lessons should include simple teaching in the general management of infants and little children and the way in which they should be bathed, clothed and fed. Attention should also be given to the personal hygiene of the child and its early training in good habits, together with its special need for warmth, fresh air, sunshine and cleanliness. The risks to health arising from unsuitable food and methods of feeding (with special attention to the dangers of dirty or contaminated milk), from dirt in any form, from insufficient or inappropriate clothing, from cold or chill, from inadequate or disturbed sleep, from lack of air and exercise, etc., should be simply explained.

Practical demonstration followed by practice.—The teaching should be made as practical as possible. Simple theory should be taught in every-day language, avoiding technical terms which would not be understood, and the girls should make careful notes. But as much as possible of the instruction should be given by means of demonstration followed by practice in which the girls take part. No expensive apparatus or equipment is required. Many of the articles needed, for example, baby-clothes, a cradle, and a baby's basket, can be made at the school, and the course should be associated with the teaching of needlework, hygiene, and domestic subjects.

It is important to secure modern patterns of the kind recommended at the Infant Welfare Centres. The cost of everything should be clearly explained and emphasis laid on the fact that it is not necessary to spend much money in order to provide everything needful for an infant's health.

A *doll* should be used for demonstration purposes. It is now possible to obtain dolls modelled on the size and weight of the real baby, which are not rigid, and which serve as an excellent substitute. The routine of the baby's bath and toilet, the best method of dressing and undressing, etc., can be demonstrated and repeatedly practised with a doll until much of the manual dexterity needed for the skilful handling of a baby is acquired. It is true that the doll is a passive instrument and that the attention of the "mother" is not diverted by the fear of injuring her fidgeting or crying charge, but this has its advantages when practising manipulations which are not yet thoroughly familiar.

Visits to Centres, Exhibitions, etc.—The classroom teaching may with advantage be supplemented by demonstration at a Day Nursery or Infant Welfare Centre where the handling of the living baby can be shown and perhaps practised; but Day Nurseries are few and far between, and the Centres where demonstrations to school girls can be given are almost equally rare, so that although such arrangements are greatly to be encouraged, only a relatively small number of girls can participate and the Centres cannot be relied upon for more than supplementary teaching.

Advantage should be taken of special propaganda in Mothercraft, such as is usually included in a local "Health Week," or may be afforded by the visit of a travelling Infant Welfare Exhibition.

If teaching can be arranged in a Secondary School and thus given to girls between, say, 16 and 18, it may suitably take a somewhat different form and be more definitely linked with science (biology or physiology), or civics, according to the point of view of the mistress in charge. The lessons may usefully include simple teaching in regard to the local health organisation, its part in preventing illness, especially among infants and children (the Maternity and Child Welfare and the School Medical Services), and its care for the health of the community as a whole.

Responsibility for the instruction.—On the assumption that the instruction will be given as a rule at the school as part of the ordinary curriculum or at a Domestic Subjects Centre, the most suitable person to take charge is a teacher on the regular staff, provided she is willing and competent to do so. If the head-mistress is able to take the class herself, this is an advantage; otherwise it should be entrusted to a senior member of the staff, preferably a married woman with children of her own. If none of the teachers has the necessary know-

ledge and experience, the co-operation of the school nurse, or a health visitor, or a district nurse may be sought, someone who has intimate knowledge of the homes from which the girls come as well as experience in infant care; but the class teacher should always associate herself with the lesson when it is given by a visiting nurse. If it is practicable to arrange a demonstration at a Day Nursery, or Infant Welfare Centre, this should be in charge of a member of the staff of the institution or a specially qualified teacher, but the class teacher should be present too.

Contact with other agencies.—It is most desirable that the teacher of Mothercraft should be in touch with local schemes for Infant Welfare. The Medical Officer of Health or his assistants (who may also be school medical inspectors) and health visitors (who may also be school nurses), are able and ready to advise how the school instruction can most suitably be linked up with infant welfare work at Centres, Day Nurseries, etc., and make suggestions as to the nature and scope of the Mothercraft course. For example, the methods of bathing, feeding and clothing an infant which are taught at the school should be similar to those recommended at the Centres to the mothers themselves, and the children should be made familiar with the reasons for taking babies to the Centre and for the visits of the health visitor to the home.

CHAPTER VII

THE HYGIENE OF FOOD AND DRINK

FOOD

1. Nutrition

A satisfactory state of nutrition in the child is the first essential to sound physical health. In recent years, the science of nutrition, enriched by many brilliant discoveries, has far outstripped its practice, and it is desirable that teachers should appreciate and teach the more obvious applications of this new knowledge.

Food, though the most important, is but one of many factors in the nutrition of the child. Abundant sleep, fresh air, exercise, and rest, also play great parts. Food should refresh, invigorate, and build up the growing body, and not merely satisfy its hunger or appetite. In quantity it should be ample to supply warmth and energy, and in quality the diet should be complete in all the essentials for full growth and health. *Healthy and complete nutrition* is, therefore, something much wider than the mere intake of sufficient food. It requires not only a sufficient and properly balanced diet, but the healthy, receptive, and responding body, and an active alimentary tract if the food consumed is to be properly assimilated. Good nutrition being thus of fundamental importance, the teacher should carry a mental picture of the well-developed and well-nourished child, which it is the aim of our national system of education to produce.

" Such a child," says Professor L. T. Roberts, " has first of all a general appearance of vitality, vigour, and interest in life that is characteristic of all healthy young animals. The skeleton is well-grown and strong, with straight arms and legs, well-shaped head and chest. The teeth are sound and well-formed, and are set in well-shaped jaws, with no overlapping or overcrowding. The muscles are well-developed and efficient as shown by their ability in running, jumping, and other activities. The posture is generally erect. There is a sufficient supply of fat to make a moderate padding over the skeleton and muscles and to give the body a well-rounded contour. There is a good supply of red blood, with a normal amount of haemoglobin and red blood cells. The nervous system is stable and the endurance is good. The child is, in short, an efficient, physically-fit young animal."

Some of the factors in the attainment of this perfect nutrition, such as heredity and home environment, the teacher cannot influence. Other important factors, such as long hours of sleep, and open windows during sleep, are only partly susceptible to his influence and example; but in food and feeding,

both by his teaching and his zeal for the children's welfare, he has done much in the past, and is now enabled to do even more.

The need for fostering, both in practice and in theory, a right understanding of foods and feeding should be present in the mind of the teacher through all stages of the child's education. The two-fold method of all Health Education, namely, habit training and informative instruction, has special application to nutrition.

Subnormal Nutrition.—The factors causing subnormal nutrition are numerous, and the subject is a complex one.

It is not enough that the body be supplied with food of any sort; that of itself will not suffice. There must be the proper proportion of nutrients: sufficient protein of the right kind to meet the demand for growth and replacement of tissue, sufficient carbohydrate and fat to yield heat and energy, and a sufficiency of the various vitamins and mineral substances necessary for proper nutrition.

Over and above this provision there must be healthy activity of those physiological processes which have to do with mastication and digestion, with absorption, assimilation, and excretion. Healthy and complete nutrition is something more than mere feeding.

We must, therefore, take a wide and comprehensive view of nutrition, estimated not only in terms of bulk and weight, but of the ratio of stature to weight; of the general appearance and " substance " of the body, and of its carriage and bearing; of the firmness of the tissues; of the presence of sufficient (but not excessive) subcutaneous fat; of the condition and process of development of the muscular system; of the condition of the skin, and the healthy redness of the mucous membranes; of the nervous and muscular systems as expressed in alertness or listlessness, keenness, or apathy; of the condition of the other systems of the body; and of the relative balance and co-ordination of the functions and powers of digestion, absorption, assimilation of food, and of the excretion of waste products. In brief, it may be said that subnormal nutrition is usually due to one of three causes—(i) shortage of food; (ii) unsuitable food; (iii) impairment of digestive powers or assimilation.

To combat the first and second, the teacher should know the value of different kinds of food, and the administrative methods whereby those necessary for the subnormal child may be obtained for him at school. The third cause can often be remedied by leading a hygienic life, by physical exercise and games in the open air, by long hours of sleep* and

* *See* page 50.

fresh air both by day and night. In the more pronounced cases of subnormal nutrition, the regime of an Open-air School, either day or residential, may be necessary.

Faulty Feeding.—" More than one-half of the chronic complaints which embitter the middle and latter part of life," said Sir Henry Thompson, " is due to avoidable errors of diet." Apart from poverty, ignorance in the choice of food—its selection, nutritive value, preparation, and consumption—has perhaps the largest share in causing avoidable errors in diet. But there are many other errors and habits in diet which share in the production of subnormal health and disease; these include (*a*) irregularity of meals; (*b*) monotony of diet; (*c*) failure to masticate properly, owing either to defective teeth, or to the habit of bolting food; and (*d*) the abuse of tea and alcoholic beverages. Bad teeth, in addition to preventing proper mastication of food, may cause septic absorption. Constipation may be either a cause or a consequence of dietary errors. Some of these may seem to be trivial matters, but it is out of the smaller habits and neglectfulness of men and women that disease is born.

As regards the subject matter of the informative instruction, older children require the same kind of practical training as that outlined for younger children, but it should be supplemented by means of the housecraft courses for older girls and science for boys. Where provision is made for teaching domestic subjects the children can be associated with the choice, selection and purchase of the food materials as well as the preparation, cooking and serving of the food. The fullest advantage should be taken of the opportunity for Health Education thus afforded. In addition to this practical basis, or in substitution for it where no domestic courses exist, much direct and indirect instruction in regard to nutrition can be given to older girls and boys, though it must be admitted that some of the value of the instruction will be lost where it is not founded upon or associated with the actual provision of meals.

2. Food Requirements of the Body

Our bodies are made up of countless minute cells which can be seen only under the microscope. These consist of protoplasm, the physical basis of life. While the child is growing the cells of the various tissues and organs of the body are multiplying and the protoplasm must necessarily increase in quantity. The first food requirement of the body is material

which will be suitable for the building up of this living substance, protoplasm. Moreover, apart from growth, protoplasm once formed is continually breaking down and requires to be renewed. Thus we arrive at the need for what we may call *body-building foods*. These are principally *proteins* and they form a very important part of such foods as meat, fish, milk, cheese, and eggs. These contain the most useful proteins, but cereal and pulse foods, e.g., flour, bread, peas, beans and lentils, also contain protein of lesser value.

The tissues of the body have work to do. They are not static but dynamic in purpose. They require the food materials from which power and heat can be derived. Therefore secondly, *energy-producing* foods are needed. These are represented by two classes of substance known as *fats* and *carbohydrates*. The former occur in milk, cream, butter, suet, lard, dripping, olive oil, etc.; the latter in all the sugars, cereals, bread and foods composed mainly of starch (e.g., potatoes, rice, parsnips and other root vegetables, oatmeal). Thirdly, there are the *salts* or mineral substances needed by the body; these are plentifully contained in milk, cheese, vegetables and fruit, the last two also furnishing a considerable bulk of indigestible fibrous material, which is of value in stimulating movements of the bowels. Fourthly, there are certain substances essential for growth and nutrition, known as *vitamins* present in extremely minute quantity in various foods. Several principal kinds of vitamins are recognised, and are called vitamins A, B, C, D, etc. The foods in which they are present and their dietetic value may be broadly stated as follows:—

The Essential Vitamins in Foods

Vitamin.	Chief foods in which present.	Dietetic value.
A	Cod liver oil, milk, butter, cheese, egg-yolk, green vegetables, lettuce, watercress, beef and mutton fat, suet, liver, carrots.	(1) Growth. (2) Maintenance of the healthy condition of mucous membranes, and consequently of their resistance to infection.
B Complex	Cereals, (outer layers and germ), pulses, yeast, milk, egg-yolk, liver, kidney, brains, cabbage, lettuce, watercress.	(1) Growth. (2) Maintenance of nervous stability. (3) Prevention of beri-beri.
C	Green leaves and fresh fruits especially lettuce, cabbage, oranges, tomatoes, lemons, potatoes, swede turnips, watercress.	Prevention of scurvy.
D	Cod liver oil, oily fishes (e.g. herrings), egg-yolk, milk, butter, animal fats.	Development of bone and teeth: (Its absence may lead to rickets).

A plentiful supply of sunlight to the skin will help in making up for deficiencies in Vitamin D; also, it may be observed that a diet satisfactory as regards Vitamins A, C, and D, is probably complete as regards B. Vitamin C is easily destroyed by overcooking. In addition to these various requirements of living protoplasm we must add *water*. The transmission of all nutritive substances to parts of the body is done by " water transport." So, too, is much of the excretion of waste.

Above all, food must be provided for the human body in the form of a *mixed* and *varied* dietary, from which the body will draw for the supply of its particular needs. The advocacy of any special article of diet may be misleading if this fact be disregarded. *Fresh* food is desirable.

3. What Foods should be eaten and Why

It is a somewhat strange fact that, with all the experience of the individual and of the race upon which to draw, many people know neither from experience nor from instinct what is the best diet at the different stages and in the differing circumstances of their lives to ensure sound health. Unsuitable feeding and overfeeding whether due to quantity or quality of food are not uncommon and produce their characteristic ill results. Broadly speaking, the simpler and plainer the food the better. Elaborate foods and sweets may spoil the taste for, and therefore the digestion of plainer foods. Not everything that tastes nice is good for the body. In the selection of food for children the following are the chief points to bear in mind:

(i) *A sufficient supply of body-building food or protein.*—This is best obtained from animal foods, such as meat of all kinds, especially offals, e.g., liver; milk, cheese, eggs and fish. Not less than a pint of milk is the daily requirement. Other foods, such as flour, bread and peas, beans and lentils also contribute protein.

(ii) *A daily supply of vegetable food.*—In addition to proteins, some vegetable (and preferably a green one) should be supplied daily; some kind of salad or fruit, especially oranges, is desirable.

(iii) *Fats.*—Butter is in short supply, but margarine is an efficient substitute and has a constant vitamin content which is essential for proper growth.

4. Quantity and Quality of Food Required

This will depend upon:—

(i) *The age of the child.*—If the amount of food required by an adult is taken as 100, the child 5 to 7 years requires 60; between 7 and 9, 70; between 9 and 11, 80; between 11 and

12, 90; and from 12 upwards, 100. Adolescents may sometimes require more than adults. These relative figures apply only to the calorie or energy needs, for the child requires a relatively larger proportion of proteins to the other foodstuffs, than does an adult. This seldom appreciated fact renders the child's diet proportionately more costly, as proteins are usually the expensive foods.

(ii) *Personal idiosyncrasies.*—Children of similar age and size may require different quantities of food because one child digests and assimilates better than another. A food that agrees well with one child, e.g. cheese or strawberries, may disagree with another. One child will dislike food that is preferred by another. Thus, in the case of children, it is important to take notice of these idiosyncrasies, but not to talk of them in the hearing of the child. If possible, it should be determined how far they are genuine or merely fads.

(iii) *Season.*—In winter rather more fat is needed than in summer for maintenance of body heat, but children require just as much food, and especially quite as much milk, in summer as they do in winter, for the maximum growth takes place in the summer months. Fruit is desirable at all seasons.

5. How and When to Eat

Nutrition is not merely a matter of getting so much protein, carbohydrates, vitamins, etc., into the stomach; it is a question of getting sustenance absorbed and assimilated by the blood and tissues. The conditions under which food is taken have much to do with the benefit the body derives from taking it. The quantity and quality of the digestive juices are influenced by the emotions associated with a meal. There is a sound physiological reason for the orderly serving of a meal, the proper appointment of the table, the display of flowers and reasonable refinement and amenities. Thus a meal should be a leisurely and sociable affair. Nothing is worse for digestion than hurrying over a meal, apart from the fact that under such conditions the food will not be properly masticated. No strenuous game or mental work should immediately follow a meal. So far as practicable, meals should be taken at regular intervals. People vary as to their requirements in this respect: some thrive on two meals a day, some on four. For most children, three good meals a day is the best arrangement. The habit of taking food between regular meals (whatever they are) is responsible for much indigestion and ill-health. So many children are brought up to take their meals with little regard to any of the conditions mentioned that the school and school teacher should take every opportunity of impressing these facts upon their minds. Most

important of all is good cooking which makes food attractive, palatable and digestible; the nutritive value of food, good in itself, is often impaired by lack of care and attention in this respect. Good cooking is one of the foundations of nutrition.*

6. Relative Cost of Foods

It is true that some of the most essential body-building foods are among the most expensive, e.g. meat and fish, but generally speaking the cheaper qualities of meat and fish are fully as nourishing as the more expensive. A herring supplies nearly as much body-building food as the same weight of salmon and at one-tenth the cost. The cheaper kinds of cheese contain as a rule rather more body-building material than the more expensive sorts, and are as easy to digest. There is no better or cheaper green vegetable than a cabbage. An orange is a better food than a peach.

7. Source, Distribution and Protection

Emphasis should be laid upon the desirability of food being *as fresh as possible*. Thus the best fish is usually fish recently caught; the best milk is clean fresh milk made safe by pasteurisation; the best eggs new laid eggs; the best vegetables and fruit those straight from the garden. But the conditions of living to-day make it necessary for people to obtain much wholesome food which has been some time in reaching us from other countries. In order that such food may remain good it has to be kept sound by canning, chilling, etc. When food is subjected to such processes there is, from the point of view of health, probably always a little lost due to subtle changes in the composition of the food when no longer fresh. The canning of foods of all kinds is a skilled industry and it is often a convenience to have canned meats, fish, milk and fruit, etc. (Reference may here be made to the fresh-food value of the home and school garden and the allotment.)

There are many Acts of Parliament and Regulations designed to prevent and control the use of *preservatives*† in food an its *adulteration*. Local Authorities are charged with the duty of maintaining the purity and wholesomeness of the food supply.

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* On the whole subject of food the teacher is recommended to consult *Food and the Principles of Dietetics*, by R. Hutchison and V. H. Mottram, 1936 (Edward Arnold & Co.); also Medical Research Council Special Report Series, No. 167 (H.M. Stationery Office, price 6*s.* 6*d.*).

† Preservatives were extensively used in the past but are now prohibited, with the exception of sulphur dioxide and benzoic acid; these exceptions are only permitted in certain specified foods, and in them only in specified and minute quantities.

Much may be learnt about the distribution and protection of foods from visits paid to local markets, and attention should be drawn to the measures taken—or not taken—to prevent contamination of food by exposure to dirt, or to unclean and unnecessary handling.

8. Milk

Milk is the most valuable single food we know for the promotion of growth and health in children.

First upon the list of " protective " foods, it contains proteins of the highest class, fats, carbohydrates, all the known essential vitamins, calcium, phosphorus and many another important mineral element, all in an almost perfect balance, and in a form which it is very easy for the body to use. Without exception, recent investigations on the subject have shown milk to be essential in the diets of children for optimum growth and physique, and for the maintenance of health. Many infants and young children suffer from lack of sufficient milk, whether mother's milk or cow's milk. This lack is at the root of much malnutrition in infancy, is closely associated with the production of rickets, and renders the child less able to withstand the onset of, or, when atttacked, to recover from the infectious diseases of childhood. It is in the children of poor families that the need for the first-class proteins of milk, and the " protective " essentials that it contains, is greatest.

An average increase of consumption of milk to about one pint per head per day would, without doubt, result in an improvement in the health of the community in general. Particularly in the case of children would it secure better bone formation, physique and stature. It would diminish the incidence of rickets, and increase resistance to disease, including dental caries. On account of its growth-promoting properties, it should form a larger proportion of the diet of children and adolescents than of adults.

*The Milk in Schools Scheme.**—This scheme, begun in 1934, gives the teachers a great opportunity to further this improvement in the health of their pupils. By it, children can purchase milk at half price ($\frac{1}{2}d.$ for $\frac{1}{3}$ of a pint). This milk, the source and quality of which has to be approved by the Medical Officer of Health, is supplied in bottles, and is drunk through straws to obviate any risk of infection from the delivery of so-called " loose " milk, or from cups. Normal children usually take $\frac{1}{3}$ pint in the morning session. It is desirable that it should be taken in school time before and not

* Under the revised scheme announced in Circular No. 119 school milk became free of charge to all school children from 6th August, 1946. Owing to the shortage of supplies the amount per child was temporarily limited to $\frac{1}{3}$ of a pint.

during, the mid-morning break. This encourages the children to take milk, and to take it slowly, and does not interfere with exercise in the open air or with the appetite for dinner. Subnormal children should usually have a second bottle during the afternoon. The importance which the Government attach to this scheme is shown by the fact that the Treasury give a substantial grant to cover the expenses of the Milk Marketing Board in supplying at half price the necessary milk, which amounts to more than 2,000,000 gallons per month. In the interests of the physical and mental welfare of the children it is most desirable that no opportunity to increase the proportion of children taking milk should be neglected. It is true that a very small proportion of children cannot take milk, but this small proportion does not account for the failure of nearly half the public elementary school children (44 per cent.) in England and Wales to obtain milk, either at half-price or free, under the Scheme. The conditions under which milk can be provided *free* for necessitous under-nourished children are set out by the Board of Education in Circular 1443 discussed below in the section on School Meals.

Teachers can exercise a great influence in this matter. Older children are apt to consider milk a baby's drink. The teacher can point out how it stimulates growth, and that many athletes train upon it. Older girls fear it will make them fat, whereas the teacher can show that in reality the chief effect of milk is to stimulate growth, and so to increase height rather than to fatten. While they are still growing, that is, up to 20 years of age, older boys and girls, athletes and scholars alike, need milk just as much as the younger children. Even skimmed milk, when it can be obtained fresh and pure, is an excellent body-building food and may be used with advantage in making milk puddings, and in baking bread. It should, however, never be given to infants. The best brands of condensed milk and dried milk are pure, wholesome, and nutritious, but not so good as fresh milk owing to slight alterations in composition as a result of the process of preparation.

Safety of Milk.—Milk as it leaves a healthy cow is free from germs. The ideal, therefore, is milk from perfectly healthy cows, milked and bottled under perfectly clean conditions. But herds in which all the cows are perfectly healthy are relatively few, and milk is liable to become contaminated with the organisms of disease in two ways: (1) organisms may be transferred from a diseased cow to its milk and through the milk to man; and (2) organisms may be introduced into the milk from the milkers or other persons who handle and deal with it, or from infected utensils. It is, moreover, often exposed to dust and dirt at the time of milking, on its way to

or at the dairy or milkshop and in the home of the consumer. The bacteria which may gain access to the milk include (*a*) those producing fermentation, (*b*) those found in sewage, (*c*) those causing diseases such as tuberculosis derived from tuberculous cows, typhoid fever, diphtheria, scarlet fever, and epidemic diarrhoea (to which infants are specially liable). These organisms, however, can be destroyed, and the milk rendered safe for consumption by suitable heat treatment such as efficient pasteurisation or boiling.

Wherever practicable, older boys and girls should see for themselves the working out of the problem of a pure milk supply by visits to a farm and dairy. Here they will see how necessary it is (i) for the cows to be healthy, amid clean surroundings, and free from tuberculosis; (ii) for strict cleanliness to be observed at the time of milking; (iii) for the temperature of the milk to be kept low (by the use of the refrigerator when necessary) and (iv) for protection to be afforded on its way to the consumer against all contamination by dust or dirt. Similarly in the home every care should be taken to protect the milk and to keep it cool. But a clear distinction between a clean milk and a safe milk should be explained to them. Cleanliness in milking and in handling milk is indeed essential, but, by itself, is not sufficient to ensure safety. Tuberculous cows, for example, may be milked in a cleanly manner, but such clean milk is not safe milk.

It is not easy to obtain herds free from disease, especially tuberculosis, and to guard against this and other infections, the Board of Education urge that, wherever obtainable, bottled pasteurised milk should be supplied in schools, *i.e.* milk which has been carefully and completely heated to 145°-150° F. for half-an-hour and then immediately cooled. This makes the milk safe and does not impair its nutritive properties to any appreciable extent. If pasteurised milk cannot be obtained, the raw milk should either be boiled or, if a boiled flavour is not liked, it should be heated in a saucepan *with constant stirring* to 160° F., and then rapidly cooled by immersing the vessel in running cold water.

9. School Meals*

This subject is of growing importance to teachers. Meals are provided in many Secondary Schools; alike for infants in

* In October 1946 2¼ million children daily had school dinners, the provision of which for all who desire them is now a statutory duty. The distinction between school canteens and feeding centres was abolished and the latter term discontinued in 1940. It was announced in Circular No. 96 that when the necessary facilities have been provided, school dinners for day pupils are to be free of charge as part of the scheme of Family Allowances.

Nursery Schools and for handicapped children in Special Schools, they form an integral and essential part of the education and treatment provided therein.

School Canteens in schools, where children, especially those from long distances, can obtain a hot dinner at a small charge, are increasing in number and, it is to be hoped, will soon be numerous enough to be an important aid in the improvement of the health and physique of children.

But even more important than any of these from the health standpoint are the *free meals* which the Education Act empowers a Local Education Authority to provide for children attending Public Elementary Schools, " who are unable by reason of lack of food to take full advantage of the education provided for them." Teachers, perhaps before others, long ago realised that, for a child to derive full advantage from education, its body must be properly nourished, and in many areas they take an active part in recommending children for free meals.

Increased attention to the nutrition of school children, and the fears of recent years that unemployment and industrial depression might adversely affect it, are reflected in the wide provision of free meals now made possible by the policy of the Board of Education.

In Circular 1443, with which all teachers should be familiar, the Board emphasised their anxiety that all children, who are unable by reason of lack of food to take full advantage of the education provided for them, should receive such supplementary nourishment as may be appropriate in each case, the meals being provided free where the parent is unable to pay, and stated that provision may properly be made for any child who shows *any* symptoms, whether *educational* or physical, however slight.

The following are several important points for teachers:—

(*a*) The increased emphasis on physical education in schools as essential to national fitness gives a new meaning to the words of the Act, for (even more than in mental education) to take " full advantage " of the physical education provided demands an adequate and balanced diet. Without it, physical exercise is futile, or even harmful.

(*b*) It is not necessary for physical signs of malnutrition to be detected before a necessitous child can be fed. Any educational evidence, any inability to profit from mental or physical instruction, any lassitude, however slight these may be, may justify provision.

(*c*) In the selection of these subnormal necessitous children, the school doctor and nurse are naturally deeply concerned, for defective nutrition is one of the most important of all defects, but only the teachers, who are hour by hour in contact with the children, have the opportunity of seeing its educational effects.

In the Circular the Board recommend that the Local Education Authority should invite reports of children who are in need of feeding from teachers, as well as from doctors, nurses, and others in daily contact with the children.

(*d*) The need of a child for feeding should not be considered only upon an application from the parent, since in that case it is certain that many children needing supplementary nourishment will not receive it.

(*e*) The supplementary nourishment, to be appropriate in each case, should make up any deficiency in the diet in either quality or quantity and bring the total diet to a proper level for the age of the particular child. As the diet of the necessitous child is deficient in foods containing vitamins, first-class proteins, and calcium, so the supplementary nourishment should be rich in them—in milk, cheese, eggs, butter, green vegetables, fruit, and meat. Sloppy meals, mere alternations of soup and potato hash, calling for no mastication, and of little nutritive value, or meals of the same "carbohydrate" type that the necessitous child gets at home, are not only not "appropriate in each case," but unlikely to be appropriate in any case.

*The Proper Content of a School Dinner.**—The dinner should be the principal meal of the day, for a tired child cannot do justice to a heavy meal at the end of his school day. Rapidly growing children require a relatively large amount of first-class or animal protein, and as this is the most expensive item in a diet, there is a temptation to cut it down.

Taking the League of Nations standards as a guide, the average healthy school child should require somewhere about 2,500 calories, 80 grams of proteins and 1 gram of calcium per day. As the dinner should be the principal meal of the day, it must therefore supply certainly not less than one third of this total need, that is 27 grams of protein (of which at least 18 grams, and preferably more, should be first-class protein), 0.33 grams of calcium and 840 calories.

* By Circular No. 1571 (12 Nov., 1941) the desired content was raised to 1,000 calories, including 20 to 25 grams of first-class protein and 30 grams of fat. Circular No. 1584 gave specimen menus.

An average of 3 ounces of meat or fish is the minimum likely to satisfy this requirement, and unless milk under the Milk in Schools Scheme is also given in school to the necessitous child as well as the free dinner, it will be difficult for the child's total daily diet to reach the 80 grams of protein and the 1 gram of calcium prescribed by the League of Nations standard. If the school be a Senior School, where all the children are over 11 years, this average minimum will be too low.

Educational Value and Social Advantages of School Meals. —If properly provided, school meals, whether given at a school canteen or at a feeding centre outside the school premises, can have an educational value for the child as great as the medical. If a properly balanced meal be well cooked and well served under attractive conditions and with a happy discipline, its nutritional value is enhanced, and its educational value incalculable. The elder children learn to wait on others and to serve them first. All learn good table manners, the importance of eating with clean hands, and of unhurried mastication, and become accustomed to a varied and wholesome dinner.

A word of praise is due to those teachers who by their voluntary interest have ensured that these conditions are attained in schools where the meals are provided on the premises.

Free meals are often given at feeding centres, designed primarily for that purpose and attended by children from several schools, but school canteens, where they exist, afford an opportunity to combine without invidious distinction the provision of free meals for necessitous subnormal children with those on payment for normal children, and so to make it easier for the poorer parents who value their independence to accept free meals offered to and necessary for their children.

The school meal, if properly provided, can, indeed, be made a peculiarly valuable occasion of education in domesticity. It introduces a sense of social obligation, of right methods, and good manners. Its full value is to-day well shown in Nursery, Open-air, and Special Schools; it remains for the future to show that it is no less valuable in the wider field of the ordinary Elementary School.

10. Water and Other Beverages

In addition to solid food the body needs also something liquid. Water is the best fluid to drink, and man cannot exist without it in some form. If a plant is not watered, and

is thus allowed to become dry, it will wither and die; in similar circumstances the human body will also die. Most foods contain a large proportion of water; and some foods, (e.g. jelly), though appearing to be quite solid, consist almost wholly of water. All fruits and vegetables contain it. There is also a considerable quantity in meat. The amount of water in food, however, is not sufficient to maintain health; it is necessary also to drink, so that food may be dissolved and made liquid. The nourishing part of the food is then in a condition to be absorbed into the blood, through which medium it is distributed to all parts of the body. Food without water would be of little or no use to the body, however good it might be in itself.

People also drink things because they like them, e.g. tea, coffee, and cocoa. Neither tea nor coffee is a real food; the only food in tea, as it is drunk in this country, is contained in the milk and sugar put into it. The difference between milk, for example, and tea lies in the fact that milk gives the body power and strength, whereas tea only stimulates the body to put forth and use the strength it has gained from real food. If people drink these things when they are tired, they feel for a short time fresher and more able to work. This is due to substances contained in tea and coffee which temporarily increase the capacity for muscular and mental work. Thus fatigue is in some degree diminished and not merely obscured; but if tea and coffee are taken too frequently, especially for the purpose of freshening up the body when it is tired, they may be harmful. When the body is tired it does not need stimulants but rest and food.

Tea should be freshly made and should not be strong. If it is left to stand long after it has been made (unless the tea has been poured off the leaves into another vessel), it soon begins to taste bitter; this is because "tannin" has been dissolved out of the tea-leaves. Besides making the tea taste bitter, the tannin is injurious to the body tissues; it hinders the assimilation of food, sometimes causes indigestion, and may do harm in other ways. Tea should be drunk, therefore, soon after it is made. Tea and coffee are not good for children; they should have milk or cocoa made with milk, because they are less stimulating and contain more food substance.

A great variety of "mineral waters" are also used for beverages. In addition there are beverages which contain alcohol, the properties of which are dealt with in the following pages.

ALCOHOL

" We accept the view that every child ought to receive specific and systematic instruction as to the properties of alcohol, as in all other matters which may affect future health, so that the child may at least be in possession of sound material on which to form a personal judgment when years of discretion are reached."

(*Report of Royal Commission on Licensing, Dec.*, 1931.)

Children should not drink beer, wine or spirits of any kind. They do not, as a rule, like the taste of alcohol; in fact, wide experience proves that alcohol is seldom any temptation to them, and yet the habit may be acquired and become a temptation later. When in health the body does not need alcohol, whereas it is always possible that various evils may arise as a consequence of drinking beverages containing it.

1. Facts about Alcohol

The term alcohol is applied by chemists to a variety of substances having a certain type of chemical constitution, but in the ordinary use of the term it is restricted to what is called " ethylic " alcohol, which is a constituent of all alcoholic drinks, and is produced by the fermentation action of yeast upon sugar. Thus wine is produced by the fermentation of the sugar in the juice of the grape, cider by the fermentation of that in the apple. The alcohol in beer is produced by the fermentation of malt-sugar, which is produced in the process of brewing, from the action of a ferment on the starch in the barley grain. Thus alcohol is produced from the fruits of the earth and is contained in beverages which are consumed in all parts of the world. Obviously, therefore, there is something in these beverages which has been found by mankind to be attractive to those consuming them. Unfortunately, such beverages may, if misused or abused, lead not to utility or benefit but to impoverishment of body or mind. Indeed, in common experience they have been found to be as seductive as their results are elusive.

During the process of fermentation traces of various substances are produced, which give rise in the main to the characteristic flavours of the different kinds of wines and spirits; but it is the ordinary or " ethylic " alcohol which is responsible for the effects produced by the drinking of alcoholic beverages.

Pure alcohol is colourless and looks like water, but it has a peculiar smell; unlike water, it has not the power to quench thirst. It will burn; hence brandy and whisky, which contain a large proportion of alcohol, may take fire.

When the body loses water, whatever the cause of this loss may be, thirst is created and a renewal of the supply of water is necessary. Hence, when a person is thirsty it is water and not alcohol that is needed. Alcoholic drinks tend to make a man more rather than less thirsty.

Alcohol has a great attraction for water, and if substances containing water are soaked in alcohol, they lose this water and become dry and hard. It is not feasible to drink pure alcohol, because it causes a hot painful feeling in the mouth, throat and stomach, and also produces direct injury. Therefore it can only be taken when diluted and made weaker by mixing it with water or other liquids.

Beer, wine and spirits all contain alcohol. There is some in beer, more in most wines, and a great deal in spirits. The percentage of alcohol by volume in some of the commoner alcoholic beverages may be stated as follows:—

Cider contains 3-6 per cent.

Lager beer, draught ale, stout contain 4-6 per cent.

Bottled beer contains 4-7 per cent.

Claret, hock, burgundy, champagne contain 9-13 per cent.

Port, sherry, contain 15-22 per cent.

Spirits:—gin, rum, whisky, brandy contain 37-43 per cent.

Some of the "medicated wines," sold by chemists and others contain a large percentage of alcohol, and, for this reason, harm may be done by their use as "tonics." A similar observation must be made for alcoholic "cocktails"

2. The Food Value of Alcohol

The food value of alcohol has been the subject of careful research in recent years. It has already been shown that there are three main classes of foods and the respective services which each renders to the maintenance of a healthy body have been indicated, viz., that the proteins supply the material for the repair of tissue waste, while the carbohydrates and fats provide the necessary fuel for the supply of energy. Besides making use of protein for tissue growth and the repair of tissue waste, the body is able to transform some of the protein into carbohydrate and thus utilise it as a source of energy. But the supply of an adequate quantity of carbohydrate and fat renders this conversion of protein unnecessary; carbohydrate and fat act, that is to say, as protein savers.

Further, besides furnishing fuel for energy, food can be stored in the body for future use. Carbohydrate is stored mainly in the liver and muscles, but it may be transformed by the body into fat and stored in that form. Alcohol can be

utilised by the body as a fuel, and it can act also as a protein saver. It cannot, however, be altered or stored by the body for future requirements, but circulates in the blood for some 15-24 hours, during which period it is very slowly burnt.

Alcohol may, therefore, be classed as a food in that it is able, by helping to supply the immediate requirements of the body, to prevent some depletion of the reserve, but for practical everyday purposes alcoholic beverages cannot be regarded from a health point of view as a source of nourishment. They are not sources of the known vitamins.

If taken in large amounts, or if taken in moderate amounts too frequently, alcohol exerts a more or less constant action which is prejudicial to the body tissues.

Alcohol has no tonic or strengthening quality.—The latest Report,* (1938), of the Medical Research Council's Committee states (page 31), " medical opinion formerly attributed to alcohol an effect of this kind (i.e. a specific stimulant action on nutrition); certain wines and beers especially were credited with specific value in the " building up of the constitution " and were widely prescribed in cases of malnutrition, such as that due to tuberculous infection. This view is no longer widely held by medical men, but appears still to be current as an article of popular belief. There are probably many who regard abstinence from alcohol as incompatible with the development and preservation of a robust and vigorous bodily habit. Accurate observations lend no support to such a belief."

3. Effect on the Brain and Nervous System

Contrary to popular opinion, the effect of alcohol on the nervous system is to depress rather than to stimulate its functions. The apparently stimulating action, as shown by the stage of excitement through which the drinker may pass, is due to its depressing action upon the highest and latest developed part of the brain, namely, that which is associated with the exercise of the intellect and of the will. The emotions released from normal control are left free play to respond to the immediate environment in which the drinker finds himself, and this as a rule is of a convivial character.

The emotional characters of the human brain are the oldest established; they have their bodily representation in certain lower parts of the brain which are developed early in the animal scale. Next in order of development come the nerve centres associated with the sensory and skilled motor functions; and latest of all is developed that part of the brain connected with the higher intellectual processes.

* " *Alcohol: its Action on the Human Organism* " (Medical Research Council), H.M. Stationery Office, 1938. (Out of print.)

Thus, the action of alcohol is to depress the functions of the brain from above downwards in the reverse of their development in the individual and in the race.

Among these successive steps the following may be noted:—

(i) Blunting of self-criticism.—Self-criticism represents the latest developed of the intellectual functions. When it is blunted things may be done or remarks made which may not be consistent with the usual behaviour of the individual. The resulting effects of this blunting are various to an almost unlimited degree; but certain of them are particularly characteristic of the action of alcohol, and emerge with considerable regularity in carefully conducted tests and experiments. Among these may be cited:—

(*a*) inaccurate workmanship in regard to mathematical calculations or such handiwork as shorthand and type-writing;

(*b*) uncritical self-satisfaction of the individual with his work and actions;

(*c*) disregard of occurrences and conditions normally requiring caution of act and word;

(*d*) trespass upon rules and conventions previously respected;

(*e*) impaired appreciation of the passage of time;

(*f*) talkativeness;

(*g*) an argumentative frame of mind; quarrelsomeness.

(ii) Interference with the performance of skilled movement. This is indicated by clumsiness of behaviour, by the slurring of words, and by insecure muscular control.

(iii) The blunting of the senses—of hearing, taste, touch and vision.

(iv) The display of the primary emotions. Anger may be displayed at one moment, and affection at another; similarly with boisterousness and depression, laughter and tears.

(v) The failure to respond to external stimulation and the eventual lapse into a heavy sleep.

At each successive stage in the process of "intoxication," it will thus be seen that the action of alcohol is chiefly *narcotic*.*

4. Capacity for Work

The habitual drinking of beer, wine, and spirits may tend to weaken the muscles of the heart and of the body generally, and so diminish the power and capacity to work. Athletes, when training for racing, boxing, football or other sports,

* "*Alcohol: its Action on the Human Organism*" (Medical Research Council), H.M. Stationery Office, 1938. (Out of print.)

usually avoid alcohol because they know the harmful effect it may have on their strength and endurance. In this connection the Royal Commission on Licensing (1929-31) point out that:—

> "the increasing tendency to mechanisation . . . has meant generally speaking, an increased demand for qualities of concentration and nice judgment in the worker in all grades of industry and commerce, for which excessive drinking must unfit him," and that the use of alcohol "as an aid to work, whether physical or mental, is regarded as physiologically unsound; and the performance of the finer kinds of work, at any rate—including, it should be noted, such responsible duties as the driving of a motor car, or the piloting of an aeroplane—may be temporarily impaired by even moderate doses of alcohol." (*Report: Paragraphs 52 and 68.*)

They also observe that:—

> "According to evidence given before us, it is the practice of a large majority of motor transport undertakings, municipal, public, and private, to require of their drivers total abstinence from intoxicants while on duty. We think this practice wise, and would welcome its universal adoption."
> (*Report: Paragraph 704.*)

The Report of the Medical Research Council (1938) already quoted, shows by Vernon's work (page 45) that even the amount of alcohol contained in half a tumbler of mild beer produces "a far greater variability not only in speed but also in accuracy and carefulness of driving."

"Some of the subjects were certain that they were driving better after alcohol whereas actually they were driving worse. Other experiments have revealed not only an impairment of attention to signals and environment, but also slower response of the eyes, hands and feet.'

Muscular fatigue following severe exertion is far less readily recovered from if alcohol is taken during the work or exertion, and the recuperative powers of those who regularly take too much drink are greatly lessened. Broadly, therefore, it may be said that experience shows that men engaged in very hard manual labour do their work more easily, in all respects, without alcohol.

In reporting on the health of men employed in very heavy trades, the Health of Munition Workers Committee stated, in regard to certain steel smelters:—

> "A few of the workers are abstainers from alcohol in any form. These latter are usually the most reliable men. When the supply of drink was restricted by the closing of the public-houses in the district, a great improvement in the health and the time-keeping of the workmen was noticed and was admitted by the men."*

* *Industrial Efficiency and Fatigue*, 1917 (Cd. 8511), page 100 (H.M. Stationery Office) (Out of print).

In the final report of that Committee, the various factors leading to the production of accidents are discussed, and an example is given of a fuse factory where the number of accidents among the night-shift workers fell rapidly after the restriction of alcoholic consumption.*

In a Return†, furnished to the House of Commons in April 1915, on the causes of the serious incidence of bad time-keeping in ship-building, munitions and transport areas, it was shown that serious loss of time occurred at the end of each week and at the beginning of the next, and it was the unanimous testimony of observers in each district that drink was by far the most important factor causing this loss.

5. Resistance to Disease

Alcohol may lower the resistance of the body to disease, that is to say, a person who habitually drinks alcoholic beverages to excess is more likely to contract illness than one who does not. The devitalising of the tissues produced by chronic alcoholic poisoning lowers the defences of the body against the invasion of germs, and consequently the body is rendered more liable to develop, and less able to throw off, diseases dependent on microbial invasion such as pneumonia, tuberculosis, septicaemia (blood-poisoning), etc. Then again, wounds, sores, and cuts heal less readily in a person who regularly drinks much beer and spirits than in one who does not, and such a person is more likely to suffer from blood-poisoning.

6. Digestion of Food

Alcohol not only increases the flow of gastric juice, but also modifies its composition, and reduces the quantity of the digestive ferment, pepsin. Small amounts of alcohol have little action on the movements of the stomach, or on the chemical process of digestion, nor do they appear to exercise an appreciable influence on the absorption of digested foodstuffs. Alcohol taken in substantial quantities, however, may lead to chronic inflammation of the stomach and bowel, the digestive functions of the stomach may be interfered with, food may not be absorbed into the blood as freely as it usually is, and the general nutrition therefore suffers.

7. Body Temperature

It is important to distinguish between the surface temperature and the deep temperature. The former is usually lower

* *Industrial Health and Efficiency*, 1918 (Cd. 9065), page 66 (H.M. Stationery Office) (Out of print).

† Report and Statistics of Bad Time kept in Ship-building, Munitions and Transport Areas. Treasury Return (H.C. 220), 1915 (H.M. Stationery Office) (Out of print).

than the latter, and it is also subject to more variation. The deep temperature remains in health almost constant, and this is indeed an essential condition of health.

The process of regulation of the body temperature is affected by alcohol in two ways. First, alcohol produces a general flushing of the surface of the skin through its action in leading to the dilation of the blood vessels of the skin, and to that extent it causes a fall in the deep temperature; and, secondly, by relieving the unpleasant sensation of feeling cold, it prevents the warning, to which this feeling would otherwise have given rise, from reaching the heat-regulating centre, and consequently the involuntary and voluntary muscular responses to that warning fail to be evoked; thus again it leads to a fall of the deep temperature. Moderate doses of alcohol, taken to relieve a temporary feeling of cold, do not, of course, seriously affect the deep temperature; but, taken before or during severe exposure to cold, may be injurious. Many arctic explorers have not permitted alcohol to be taken as a beverage by members of their expeditions, partly because it causes this loss of heat, which is especially serious in cold climates, and partly because it diminishes the muscular strength and the capacity for endurance. A man drinking much alcohol, in a very cold climate is likely to suffer severely, or even die, from the cold because of the heat that is lost from the body on account of the alcohol. On the other hand, as a restorative after severe exposure to cold, it may prove of value in promoting the circulation of the blood, provided that the individual is protected from further exposure.

This action of alcohol in disturbing the normal working of the body's heat-regulating organs is also prejudicial when the external condition is unfavourable to the loss of heat; hence alcohol has been found to predispose to sunstroke.

8. The Effect of Continued Indulgence

As a result of continued alcoholic indulgence, some of the effects of alcohol on the human system may become permanent, and the character of the individual is modified. The general intelligence, the will power, the understanding, the ability to think and to reason clearly, are injured and weakened. The judgment becomes less accurate and balanced; the memory becomes insecure; the power of voluntary attention is enfeebled, and that of calculation retarded. Thus mental activity generally is reduced and the work that is done becomes increasingly inaccurate, careless and untrustworthy.

Then, further, the finer emotions and sensations are blunted and the effective control of the brain over the muscles is weakened. As one result of this loss of control, accidents,

such as falls, or factory mishaps with machinery, may occur. Skilled movements requiring delicacy of touch and precision in execution are affected adversely by even small doses of alcohol. The trembling shaky hands of those who take too much alcohol are characteristic of loss of control by the brain, and this is especially detrimental to the man who earns his living by skilful manual work requiring deftness of touch. Detailed investigations have been made into the effects of moderate doses of alcohol on neuro-muscular co-ordination and particularly on the accuracy and speed of typewriting. It was shown that " [the] reaction was invariably in the direction of diminished control of the muscles, as was shown in the number of typing and adding-machine mistakes, by diminished typing speed and by increased error in pricking a target."*

The habitual excessive use of alcohol leads also to permanent mental disorder, as shown principally by failure of memory, failure to control the emotions, and a general weakening of will-power. Comparatively rarely, probably, does it produce what is ordinarily recognised as insanity, but it has a strong tendency to render active some forms of insanity that might otherwise have remained latent and unsuspected. Furthermore, since sufferers from insanity are liable to become addicted to excessive drinking, some forms of intemperance may sometimes be regarded as symptomatic.

A person who frequently takes much alcohol becomes less fit and healthy, partly owing to its cumulative effect. Neither his muscles nor his brain are capable of as much exertion as those of a person who abstains or is strictly temperate, and the quantity and quality of the work that is done invariably show more or less deterioration.

The Report of the Royal Commission on Licensing, 1931, sums up the scientific position in regard to the properties and physiological effects of alcohol as follows:—

(1) Alcohol is primarily a drug acting directly on the nervous centres.

(2) The action of alcohol is essentially narcotic and not stimulant.

(3) Alcohol taken in excess may exert, like any other drug, a poison action; and if taken habitually in excess may cause or contribute to a variety of diseases.

* These, and other experiments including Miles' work with a special electrical apparatus (the " pursuit-meter "), are described on pages 56 to 62 of the Medical Research Council's Report " Alcohol: its Action on the Human Organism," H.M. Stationery Office, 1938 (Out of Print).

(4) The drug or poison action of alcohol is substantially restricted when alcohol is taken in dilute solution or with food.

(5) Alcohol has a certain food, or fuel, value, the scope of which, however, is strictly circumscribed by the disadvantages of its drug action.

(6) The use of alcohol as an aid to work, whether physical or mental, is physiologically unsound.

(7) Alcohol has no direct curative or prophylactic properties, although within a strictly limited range of conditions it has a certain therapeutic value.

(*Paragraph* 81)

9. Mortality Tables

It is well-known that men and women who are occupied in the manufacture or sale of alcoholic beverages, and are therefore constantly liable to the temptation to drink them in excess, do not usually live so long as the average healthy man, and the mortality among them is higher than in many of the so-called " dangerous trades." This is well shown in the table for the years 1930-32 provided by the Registrar-General as an appendix (page 164) to the Report of the Medical Research Council.

In respect to the general relation obtaining between the consumption of alcoholic beverages and longevity, the Committee which prepared this Report considered the following deductions justifiable:—

(1) When a simple division is made between abstainers and non-abstainers, so that the latter class necessarily includes a proportion of heavy drinkers, abstainers experience a more favourable rate of mortality.

(2) The mortality rates of persons especially exposed to temptation to use alcohol freely are unfavourable.

(3) The statistical evidence at present available does not suggest that a strictly moderate use of alcohol unfavourably affects the mortality rates of the users.

10. Social Effects

A person who takes too much alcohol becomes unfit either for responsibility or a good day's work. Intemperance therefore tends to result in poverty. The causes which lead a man to wrong-doing may be various; some may be of long standing in the life of the individual; others may have been operating only immediately before evil is done. If one takes such common offences, as, for example, assaults, cruelty to animals, damage to property, it has been held that a relatively high percentage of such offences is attributable directly or indirectly to drink.

Many families have only sufficient money to enable them to provide for essential requirements. There must therefore be curtailment somewhere, and as the rent cannot be reduced this would probably mean that less would be spent on food and other necessaries. So that quite apart from the direct effects of immoderate drinking on the individual, the aggregate sum available for food and other necessaries of life is reduced if too much be spent upon luxuries, like alcoholic drinks, and some families must suffer. Yet no one can be healthy or efficient who is deprived of the actual necessaries of life.

11. Prevention of the Evils arising

Recent years have shown a large decrease in the amount of alcoholic drinks consumed, and certainly a great diminution in heavy drinking. Many causes have operated to bring this about; for example, the higher price of beer and spirits; restrictions imposed by law on the sale of drink, etc. Important social changes also have been operating, such as the influence of transport, outdoor recreations, and counter-attractions, such as the cinema and wireless; and the general educational developments affecting particularly young people, including specific instruction in the subject of hygiene and temperance. There is, broadly speaking, less temptation than formerly to spend time in the public house. This growing sobriety of the nation is having a good effect, not only upon the health and capacity of the individual, but also upon the general standard of industrial efficiency.

The policy of certain *life assurance offices* of late years has been to give somewhat more favourable terms to total abstainers, as it has been recognised that such persons are on the whole likely to live longer than non-abstainers. There is no evidence that the moderate use of alcohol shortens life, but numbered among non-abstainers will inevitably be some who drink to excess. Practically all offices charge special terms on the lives of " beer-shop keepers, licensed victuallers and their servants." It is the frequent practice of accident insurance companies to allow to total abstainers a reduction of premium, varying from 5 to 10 per cent.

During the Great War, restrictions on the sale and supply of intoxicants were introduced into most areas of Great Britain and there was a remarkable decline in the number of

(*a*) convictions for drunkeness (by 85 per cent.);
(*b*) cases of delirium tremens;
(*c*) deaths from alcoholism.*

* See Fourth Report of the Liquor Control Board (Cd. 9055, H.M. Stationery Office) (Out of print), 1918, which records these results both among men not on military service and among women; also, " *The Control of the Drink Trade in Britain* " (a contribution to national efficiency during the Great War), by Henry Carter (Longmans, Green & Co., London, 1919, price 4*s.* 6*d.*).

The remedy for the evils following alcoholic indulgence rests partly with the individual and partly with the State. Further, both in the individual and in the community the habit of consuming alcohol is influenced by a great variety of factors (faulty nutrition, bad housing, overcrowding, unsatisfactory industrial conditions, inadequate facilities for healthful recreation, false ideals, urbanisation, etc.).

CHAPTER VIII

THE PROGRESS TOWARDS HEALTH

1. The Growth of Preventive Medicine

England began to learn the need for public sanitation in the early days of the Roman occupation of this country from 55 B.C. until 410 A.D. Rome had practised sanitation and hygiene throughout the Empire, including land and house drainage, the provision of water-supplies, the building of roads and hospitals, the control of food, house heating and ventilation, and the appointment of medical officers, and many remains of such applications of science are still to be found in Britain, as well as many remnants of Roman law. In the Middle Ages the English people were not infrequently faced with famine and pestilence, leprosy and its allied diseases being prevalent. Many scores of leper hospitals were built and special laws enacted for the isolation of lepers from the rest of the community. Many preventive measures in England may thus be said to date from about eight hundred years ago when, at the beginning of the twelfth century, the ravages of leprosy led to attention being directed to the insanitary conditions and unhygienic habits of the people, and the advocacy and prompt adoption of some primitive preventive measures.

Then in 1348 came the Black Death, which apparently originating in Asia, covered Europe, reaching England in August at certain ports in Dorset and Devon. It spread everywhere and is believed to have killed almost half the population. Worst of all this disease seems at this time to have established itself in England, for we have many records of its devastations down to " the great plague of London " in 1665. It is possible that the fire of London in 1666, which raged through 400 streets and destroyed 13,000 houses, may have had a beneficial effect as a drastic sanitary measure, but whether that be the case or not the plague was stayed, and has never regained foothold in England since.

After the Black Death came sweating sickness and ague; then typhus, smallpox and scurvy.

In the eighteenth century alcoholism was rampant, and also scarlet fever, diphtheria and smallpox. In the nineteenth century there were four epidemics of cholera, and influenza

was all too prevalent. All these diseases not only killed many people, but disturbed the whole population, and men began to explore ways and means of controlling them. The nation had to learn how to protect itself.

Scurvy is the outstanding example of a disease terrible in its results, but now, as we know, relatively easy to cure and prevent. Scurvy " used to cripple fleet after fleet and to waste thousands of the bravest lives." Men's minds, however, were not then turned in the direction of prevention and they were slow to co-ordinate and apply such knowledge as they had. Sir Richard Hawkins in 1593 showed the value of orange and lemon juice in preserving the health of seamen, but his ideas were not taken up. Many years later Dr. James Lind in his " *Treatise on the Scurvy* " (1754) revived the idea.

In this connection the story of Captain Cook and his adventures will always interest children. Between July, 1772 and July, 1775, with a company of 118 men, he performed a voyage of three years and twelve days through all the climates from 50° N. to 71° S. with the loss of only one man by disease and it is said that this man was tuberculous before he embarked. He took certain health measures, largely new in his day, and some of them probably looked upon by his contemporaries as fads. They included " proper provision of food, which was made to include lemons and oranges, sauerkraut, sugar, portable soup or broth, and malt for milling sweetwort; avoidance of too long night watches; avoidance of unnecessary exposure to weather; insistence on dry shifts and keeping persons and hammocks clean; insistence on keeping ships clean and dry; ventilation by wind-sail, and by frequent use of portable fire at bottom of well; great care for fresh water to be renewed at every opportunity; and for fresh provisions, animal and vegetable, wherever possible."

Twenty years later (1795) the Admiralty made the use of oranges and lemons compulsory in the Royal Navy.

2. Some Great Health Pioneers

There are many pioneers from whom to choose, but special reference may be made to Edward Jenner, the discoverers of anaesthetics, Pasteur, Lister, and the conquerors of malaria.

(*a*) Introduction of Vaccination

One of the great landmarks in preventive medicine was the introduction of vaccination at the end of the eighteenth century by Edward Jenner. Up to the time of Jenner smallpox was

a dreaded and loathsome disease producing ravages difficult for us nowadays to picture. The doctors of the eighteenth century sought to prevent the disease by inoculation of the healthy from mild cases, thus hoping also to reduce its severity. Jenner believed that vaccinia, a disease of the cow, though not infectious from man to man, was inoculable and could protect against smallpox. He advocated and established accordingly the practice of vaccination, as better than inoculation. Vaccination consists in passing through the human being the very mild disease known as cow-pox or vaccinia. This was the first practical demonstration of the protective power of immunity. In the countries where vaccination was thoroughly practised smallpox was reduced in prevalence and mortality. Since Jenner's discovery other diseases have been prevented by a similar method.*

(*b*) Discovery of Anaesthesia

Another great discovery was that of the anaesthetic property of nitrous oxide (" laughing gas ") by Sir Humphry Davy in 1799. Dr. Hickman of Ludlow, Dr. Morton in America, and Sir James Young Simpson, of Edinburgh, established from 1824-1847 the anaesthetic power of carbonic acid gas, ether and chloroform. They found that a small dose of these drugs produced a temporary unconsciousness of the individual and so abolished pain. Hence it was possible to obtain anaesthesia and the former excessive pain of surgical operations was removed. This opened up a vast field to the surgeon, since operations, being painless to the patient, could now be more carefully and slowly performed. Accordingly, in recent times

* A visit to the Wellcome Historical Medical Museum, Euston Road, London, would be a valuable means of illustrating to London children the historical development of medical science. This Museum shows the practical application of the discoveries and practices adopted throughout the ages and those employed at the present time for fighting disease. During their last year of school life pupils should, with permission, and if opportunity offers, visit this Museum, where they will see the work of Harvey, Galvani, Jenner, Lord Kelvin, Lister, Pasteur, Ross and other pioneers well illustrated by means of models, pictures and diagrams. There are models illustrating hospitals and surgeries of a hundred years ago, and hospitals in the time of the Great War. The Hall of Primitive Medicine provides a contrast to the methods used in modern medical science, and shows the place which magic and religion formerly took in the daily life and social customs of mankind. The charms, talismans, amulets, mascots, etc., which have all taken their place in the life of mankind are arranged in geographical order. This provides a link with the geography lessons and leads to a better and more sympathetic understanding of the life of primitive tribes.

surgeons have been able to undertake operations of a nature which before the middle of the nineteenth century would have been regarded as beyond the bounds of possibility.

(*c*) Pasteur and the Cause of Disease

In the middle of the last century Louis Pasteur, a French chemist, one of the greatest scientists of all time, discovered the part played by germs in the production of disease. His life and work, a story of heroism, can be made full of interest to children. He worked under the greatest handicaps. "As a laboratory he had but a hut—but his courage never failed him; if his difficulties were great, his perseverance was greater." To him we owe the discovery of the means of controlling silkworm disease, a matter of great importance to the French people. He discovered how to prevent woolsorters' disease (anthrax) which played havoc among flocks of sheep and was dangerous to men handling the hides of animals which had died from it. Another practical discovery of Pasteur, and most valuable to the wine-growing industry, was that of the cause of fermentation and the "souring" of wine and beer. He demonstrated the causes of infective disease, and, in particular, the means of preventing hydrophobia, formerly not uncommon in England, but now practically never seen. Through the labours of Pasteur the mortality was greatly reduced. Lastly, he discovered that the blood of an animal healed from infective disease contains substances which had destroyed the poison or toxin of that disease. This was the starting point of our knowledge of anti-bodies existing in the blood, which opened up the development of the use of antitoxins in diphtheria. It is upon his researches and the work and discoveries of his famous German contemporary, Robert Koch, that many of our present day methods for the prevention of diseases of all kinds are founded.

(*d*) Lister, Founder of Modern Surgery

The work of Pasteur was followed by Lord Lister, the great English surgeon who laid the foundation of modern antiseptic surgery. Thousands of people used to die after surgical operations owing to the putrefaction of the wound, thus causing blood poisoning. Lister explored the process and cause of such putrefaction, and discovered that if he could prevent the germs of disease entering the wound from the outside air, or destroy them in the wound, the patient did not suffer or die from septic poisoning. By the use of antiseptic substances he destroyed the septic germs and the

patient made a good recovery. His discovery has saved an incalculable number of lives and made surgery safe and possible in many ways previously undreamed of.

(*c*) Conquest of Malaria

In our knowledge of malaria, Laveran was the man who discovered the blood parasite which causes the disease. Then Sir Patrick Manson demonstrated the role of a blood-sucking insect as an intermediate host in the life cycle of a human blood parasite. This he did in his research on the development of the filaria worm in the mosquito, which suggested to him investigation into the possibility of there also being an intermediate stage of the malaria parasite in the mosquito. After prolonged research in India, Sir Ronald Ross (working with Manson) revealed the cycle of the development of the malaria parasite of birds in the mosquito, and indicated the first stages of the development of the human malaria parasite in that insect. Grassi and others completed the work by exploring the various stages of the development of the human malaria parasite in mosquitoes. The whole discovery was thus the work of a number of investigators, following up each other's findings by deduction and induction.

In various parts of the British Empire and elsewhere many explorers and settlers have lost their lives through malaria and yellow fever. These mosquito-borne diseases were so rife that they were one of the chief causes which led to the giving up of the first attempts to cut the Panama Canal. Surgeon-General Gorgas, applying the new discoveries, was able to prevent such disease and so secure a band of healthy men capable of completing the enormous undertaking of the construction of the canal. Malaria is also prevented by land drainage, which removes the favourable nidus of the mosquito, and by screening the house and person from its attacks. It is treated and prevented in the individual by quinine or its derivatives.

3. More Recent Developments

Other illustrations of successful action in the prevention of disease may be drawn from the fight against smallpox, tuberculosis, diphtheria and other communicable diseases, from the work being done in the prevention of blindness, in rheumatic heart disease, crippling in its various forms, and above all in the widespread education of the people in everything which leads to a better and more resistant physique.

Sanitation.—While these doctors and scientists have been busy teaching us the circumstances, character and treatment of infective diseases, and others have been showing the way to prevent them by modern methods and new knowledge of medicine and surgery, the sanitarians have been engaged in fighting disease as it attacked the community. This they did by separation of the sick from the healthy, by providing for the very poor unable to help themselves, by creating the "sanitary idea" in the public mind, and by improving houses and workshops. Sir Edwin Chadwick and Sir John Simon were the prominent leaders. Chadwick inquired into the bad conditions of the poor, and Simon and his colleagues investigated epidemic disease and devised effective methods of sanitary administration. Various Commissions of Inquiry were instituted, and Parliament passed a series of Poor Law, factory, educational and sanitary Acts, which resulted in (*a*) the formation of a central body which later became the Ministry of Health; (*b*) the creation of Local Authorities undertaking health duties, supervised by central departments; (*c*) provision of grants in aid from the Exchequer; (*d*) local appointment of Medical Officers of Health; and (*e*) establishment under the Local Authority of public medical services in every district—hospitals and clinics, midwives, school doctors, dentists, nurses, child welfare centres, health insurance, etc.

Duties of Sanitary Authorities.—In addition to the many duties of Sanitary Authorities in guarding and fostering individual health and ensuring a healthy environment, they have multifarious other functions. For instance, they are vigilant to secure that the public water supply is free from harmful impurities, that milk is produced under suitable conditions and is not adulterated, that unwholesome food is not put on sale, and that the streets are kept clean from refuse. Besides the Medical Officers, the health visitor, the school nurse and the sanitary inspector are all appointed for health purposes. One of the most outstanding examples of the value of the work of the health departments is the great saving of the lives of young infants to which it has led. Thirty-nine years ago out of every 1,000 babies born in England and Wales about 150 died before they reached their first birthday. Now the number (in 1938) is 53. Equally important with the organised system of public medical officers and their official colleagues is the private medical practitioner. Almost every family in England consults its own practitioner; he deals with ill-health at its initial stages, and he is the missionary of hygiene and preventive medicine.

Co-operation by the general public.—The various health departments and health officers, whether central or local, depend for the success of their efforts upon the co-operation

of all citizens, including children.* Indeed, it is true to say

* It may be convenient to mention some of the principal statutory Authorities and Voluntary Societies concerned in public health organisation. Most of the central responsibility for matters pertaining to health falls to the *Ministry of Health*, the medical work of which includes (i) the supervision of general sanitation, including housing, water supply, disposal of sewage, pollution of rivers; (ii) administrative control of infectious disease, including examinations of ships, aircraft, and port sanitation; (iii) maternity and child welfare; (iv) the control of food and the milk supply; (v) insurance medical practice; (vi) international health; (vii) vital statistics; and research. The *Board of Education* are concerned with the medical (including dental) inspection and treatment of school children (by delegation from the Ministry of Health), physical training, provision of meals, provision of special schools for various types of afflicted children, and the hygiene of the school building. The *Board of Control* are responsible for the administration of the Lunacy and Mental Deficiency Acts. The *Dental Board* (44, Hallam Street, W.1) in addition to their other duties, are concerned with dental health education and they are prepared to send demonstrators to schools to give illustrated talks to the children. Their publication on the "Hygiene of the Mouth and Teeth" (price 1s. 6d., post free) should prove particularly useful to teachers.. Application for educational material in connection with dental hygiene should be made to the Dental Board, who will supply leaflets free of charge; a small charge is made for posters, charts and similar material. The Local Authorities include the *Parish Council* which is concerned with burial grounds, lighting, and the provision of open spaces, together with limited powers in regard to water supply and nuisance prevention. The *Rural District Council* and the *Urban District Council* have much wider powers covering the field of housing and town planning; provision of water supply; arrangements for drainage and the disposal of sewage; removal of refuse and the abatement of nuisances; provision of sanitation in work places; protection of food, and in particular the control of milk supplies; the prevention of infectious disease; and the collection of vital statistics. *Borough Councils* have similar powers but the larger ones (as well as a few of the largest Urban Districts) administer in addition the Maternity and Child Welfare and School Medical Services, while *County Borough Councils* provide for the administration of public assistance to the sick, treatment of tuberculosis, and cancer, prevention of river pollution, and the analysis of food, drugs and fertilisers. *County Councils* have similar powers, together with certain powers of supervision over Borough, Urban, and Rural District Councils.

Other bodies concerned with the work of health education include the following *Health Societies*. Central Council for Health Education (B.M.A. House, Tavistock Square. W.C.1); National Council for Maternity and Child Welfare (117, Piccadilly, W.1); Industrial Health Education Society (Tavistock Square, W.C.1); Health and Cleanliness Council (Aldwych House, W.C.2); National Milk Publicity Council (33, Gordon Square, W.C.1); National Safety First Association (119, Victoria Street, S W.1); Junior Red Cross (British Red Cross Society) (14, Grosvenor Crescent, S.W.1); Royal Sanitary Institute (90, Buckingham Palace Road, S.W.1); National Association for the Prevention of Tuberculosis (Tavistock House, North, Tavistock Square, W.C.1); The People's League of Health (12, Stratford Place, W.1); Child Guidance Council (Woburn House, Upper Woburn Place, W.C.1); Central Association for Mental Welfare (24 Buckingham Palace Road, S.W.1).
The means generally adopted in undertaking this work include conferences, lectures and demonstrations, posters, competitions, lantern slides and films, reports and other publications, participation in health weeks, etc

that the public health depends more upon an educated people with a "health conscience" than upon Acts of Parliament or medical officers and sanitary inspectors. If children learn at school the importance of personal cleanliness, wholesome food, ventilation and a healthy way of life, they are likely to carry such habits into practice when they leave school, and in this way will not only assist the local sanitary department in their task, but will also do much to build up the health and secure the well-being of the community. Above all, they will tend to add to their own length of days and to their own health, capacity and happiness.

CHAPTER IX

CONDITIONS OF A HEALTHY ENVIRONMENT

1. Housing and Town Planning

Fitness for human habitation.—In this country we spend a considerable proportion of our lives indoors. Accordingly, it is important that our houses should be healthy, i.e. fit for human habitation, and so constructed and planned that they provide us with adequate protection from the rain, wind and cold whilst affording us the maximum of fresh air, sunlight and comfort. Generally a house is regarded as fit for human habitation if it provides adequate shelter and cubic capacity for its occupants and is—

(1) free from serious dampness;

(2) satisfactorily lighted and ventilated;

(3) properly drained and provided with adequate sanitary conveniences, with a sink and suitable arrangements for disposing of slop water;

(4) in good general repair;

and is provided with

(5) a satisfactory water supply;

(6) adequate washing accommodation;

(7) facilities for preparing and cooking food; and

(8) a cool well ventilated store for food.

No house can be healthy unless it is dry and weatherproof, but serious dampness will seldom arise if it has a proper damp-proof course, a sound roof and the walls are kept well pointed and free from defective rainwater gutters or pipes. Low lying land should always be avoided when building a house. The requirements which may be regarded as constituting "fitness" in regard to such items as water supply, sanitary conveniences, disposal of slop water and drainage vary considerably as between urban and rural localities. For example, in rural areas a well or rainwater storage tank, earth closet and one of several systems for dealing with slop water may well be legitimate substitutes for the piped water supply, water closet and connections to a sewer which are insisted upon in urban areas where the necessary public services are available.

Overcrowding.—The erection of too many houses to the acre leads to excessive density, and thus to overcrowding of houses on the land and unhealthy areas. The evil effects of such density may be shown by an increase of sickness and disease,

especially among young children, leading to high general and special death rates. Moreover, when people are born, live, sleep and die under conditions of serious overcrowding one cannot be surprised if the effect is shown in drunkenness, crime and misery. The extent to which serious overcrowding in both towns and the country still exists can be seen by reference to the census returns of any particular district. In London, for example, the census return for 1931 shows that more than 12,000 one-roomed homes are occupied by four or more persons. It is, unfortunately, possible in most urban areas to observe how towns and cities in the past have been allowed to grow in haphazard fashion without plan or foresight. Even yet the need for town-planning is not fully appreciated. What can be done in this direction is well shown by a visit to such garden suburbs as Bournville and Port Sunlight, and to such new towns as Letchworth and Welwyn Garden City, designed and built for healthy residential, industrial, and social life.

2. The Supply of Pure Water

A public water supply may be obtained from wells, springs, rivers or lakes. When taken from shallow wells or rivers it must usually undergo a systematic process of purification owing to possible pollution by sewage, animals, trade effluents, and sometimes house refuse. Pollution of wells by cesspools, manure heaps, or decomposing animal matter must be guarded against. In this country the water supply of towns is rarely a danger to health, as elaborate precautions are taken to prevent its contamination at the source, during transit or otherwise. The two chief risks of pollution are disease germs, such as those of typhoid fever, or chemical impurities such as lead in solution. Germs of disease may gain access to water derived from a well or river near to some source of pollution. The simple precaution of boiling should be applied to any drinking water, the purity of which is open to suspicion. Lead may occur in very soft water owing to acids in the water attacking the lead pipes, if they are not coated internally with some insoluble lining. Boiling is no protection against such a danger.

In most of the larger towns in Great Britain the average supply of water per head of the population is 25-30 gallons per day. This amount includes water used for personal, municipal and industrial purposes.

3. The Disposal of Refuse

Various methods.—In rural districts it usually falls to each householder to make his own arrangement for the disposal of refuse and waste matters. There the problem of dealing with

them is, as a rule, not a difficult one as they have a certain manurial value and land is readily available where they can be dug in or buried. In urban areas, on the other hand, conditions are different and it is realised that only by combined efforts can waste matter be suitably collected and promptly destroyed mechanically and hygienically. This work is undertaken by the local sanitary authority, at the cost of the local rates. Methods of disposal are required for (*a*) house, trade and street refuse; (*b*) excreta—the waste products of the body; and (*c*) waste water.

The disposal of excreta in urban districts is nowadays usually effected by the water-carriage system, and in rural districts by earth closets, cesspools, etc. The two great advantages of the water-carriage system are (1) that these waste matters are removed from the vicinity of the dwelling-house at once instead of being allowed to remain in privies or pail closets for weeks; and (2) that they are carried away by underground channels, the sewers.

4. The Guarding of Health in Factory, Workshop, and Mine

Statutory requirements.—Before the passing, during the last century, of the various Factory Acts many adults and children worked for long hours under insanitary conditions in all sorts of factories, workshops, and mines. Thus, as industry has developed, it has been necessary to make Statutory provision for safeguarding the health of those engaged in it. There are certain general requirements applicable to all forms of industry and designed to secure in factories and workshops the provision of proper ventilation, lighting, air space, temperature, cleanliness, sanitary accommodation, and so on. Hours of labour are regulated having regard to the age and sex of those employed, and provision made for escape in case of fire, and for protection from machinery. In some occupations there are special requirements on account of the nature of the work. For example, certain harmful dusts, fumes or gases may be generated, and precaution must be taken to see that they are effectively removed from the atmosphre of the factory. In other trades the handling of certain chemicals may produce skin disease or even poisoning after a time, and in such occupations it is particularly important that the hands of the workers should be scrupulously washed before meals.

Dangerous trades.—As examples of dangerous trades may be mentioned those connected with work in certain metals such as arsenic, mercury, phosphorus, and lead, and those associated with much fine dust, whether of animal, vegetable, or mineral origin. Special care must be taken by men working

in such processes as plumbing, dyeing, colour grinding, painting, and in the manufacture for example of red and white lead, glass, and electrical accumulators. Workers in stone may have their lungs affected by the minute particles of silica which fill the air in the process of cutting and chipping, while workers among hides and wool and hair may develop what is known as " Wool-Sorters' Disease " caused by the anthrax germs with which they may be infected. The coal miner is not necessarily an unhealthy workman, but he often works in darkness and in a strained position, is liable to inhale coal dust, and is subject to accident to life and limb. The installation of pit-head baths has added greatly to the health and amenities of the miner's life.

Industrial fatigue.—During and since the War a good deal of attention has been given to the question of Industrial Fatigue, and to what is known as industrial physiology and psychology. The proper length of working hours and spacing of intervals for rest and recreation have been studied, and questions such as lighting, posture, noise, and monotony of work have received much attention. It has been shown frequently that the accuracy and output of work are more affected by these conditions than has generally been believed. Fatigue may be measured by studying the output of different workers working under different conditions, the quality of the work done, the frequency of accidents, the amount of time lost by sickness and in other ways.

Industrial welfare.—A development of comparatively recent years is the growing provision of industrial welfare schemes. Many firms and employers have realised that the efficiency of the worker is dependent largely upon his health, and have taken steps to provide canteens where good food can be obtained at a reasonable cost and partaken of in pleasant surroundings. Facilities for recreation, especially for out-of-door games, are being extended by the provision of sports-fields and club-houses, while medical, dental and nursing care are available for the employees of a number of large firms.

CHAPTER X

PREVENTION OF INFECTIVE DISEASES

Ordinary infectious diseases such as measles, whooping cough, scarlet fever, diphtheria and some contagious diseases such as pediculosis, impetigo, ringworm, are so common in schools that children may well learn to take an intelligent interest in these ailments, to appreciate the importance of (*a*) the seed, i.e. the germ, and (*b*) the soil, i.e. their bodies, and that both the avoidance and the spread of these diseases are often a matter concerning the individual himself rather than his surroundings. Simple facts about bacteria and their role in nature should be learnt in connection with nature study and science lessons. Unless one emphasises the beneficent work of bacteria (*see* p. 60), children come to associate bacteria only with disease and lose correct perspective.

1. The Nature of Germs

Any instruction on the subject of communicable diseases must needs be preceded by reference to the activities of micro-organisms. A popular and convenient term for all these micro-organisms is " germs," though the word is not employed in scientific books. These minute living things are so small as to be invisible to the naked eye, and some of them are too small to be seen even with the aid of the most powerful microscope. They are none the less real on that account; just as air, for example, is invisible but its existence and composition can be proved in other ways, so our knowledge of these germs is derived from the effects they produce. There are two common misconceptions about germs which should be dispelled. People often think of them as belonging to the animal kingdom, whereas most are lowly forms of plant life. Nor are they all our enemies; the varieties of germs which are capable of causing disease are very few in number compared with those which are harmless or actually essential to agriculture and industry.

2. The Entrance of Germs into the Body

Germs can obtain entrance to the body by being inhaled, by being swallowed, or through a breach of the skin. The first of these routes is by far the most common. The breath of a person suffering, for example, from influenza may contain many of the germs responsible for causing this disease, and such a person when coughing or sneezing forcibly propels them into the atmosphere in his immediate vicinity and pollutes or " infects " it. Children will usually be familiar

with the fact that a moderately heavy ball can be hit or thrown much further than a very light one. This may be used to illustrate the fact that germs are so small and light that they could not be projected for any distance by coughing and sneezing if they were not enveloped in the little drops of moisture which are expelled at the same time. These little drops of moisture can convey the germs or the " infection " all through a moderately sized room and the process is, therefore, spoken of as " droplet infection."

Such of these droplets as are not removed by ventilation or inhaled by another person settle to the ground and on articles of furniture, etc. The moisture enclosing the germs dries up, especially under the influence of sunshine, and for the most part the germs die, since, like other plants, they require moisture and food to keep them alive and in addition they are accustomed to live at a temperature somewhere near that of the human body. Therefore, although articles of furniture, clothing, school books and so on may have been " infected," speaking generally the germs in them quickly die. Emphasis should, therefore, be laid on the fact that, in the case of communicable diseases, persons play a much greater part than do inanimate objects.

3. The Avoidance of Germs

We cannot hope to abolish the germ—if we could we should then, of course, get rid of the particular disease associated with it—though we can learn how to avoid it and how to make our bodies strong to resist the attack or to lessen its severity. Thus the deadly malaria has almost disappeared from many parts of some countries as the result of getting rid of the breeding places of mosquitoes, or of other methods based on the knowledge that mosquitoes are the agents that spread the disease. Typhoid fever has been almost eliminated from this country by sanitation and cleanliness, and preventing the contamination of foods, milk and water supplies by filth. Tuberculosis is being steadily reduced year by year partly because of improved sanitation and nutrition, partly because of a wider degree of natural immunity, and partly because of reduced infection and better education.

4. The Spread of Infectious Disease

The child may well be trained to understand the responsibility of each individual of the family for the spread of communicable diseases. Thus *ordinary colds* are passed on by direct communication from one person to another. No one should ever sneeze or cough near another person without guarding the mouth and nose with a handkerchief, or otherwise. If the minute particles discharged from the mouth and nose

of a person with a cold did not get passed on to another person, there would be no spreading of colds. This is why colds are so much less frequent at open-air schools and sanatoria; fresh air is always blowing about between individuals and the germs that are carried off in the minute particles discharged from the mouth get diluted. Moreover, when blown about in fresh air many germs have a very short life. It takes a large number or dose of germs from one person to start a cold in another person. It is this fact which has such an important bearing on the question of ventilation, since the movement and removal of infected air tend to dilute the infected material contained in the atmosphere of a room and reduce the likelihood of its direct passage from person to person.

Scarlet Fever again may be, and indeed usually is, spread from person to person when there is inflammation of, or discharge from, the throat or nose, or ears, or possibly from the skin; the germs may pass in droplets through the air directly to another person. *Diphtheria*, still mainly associated in people's minds with drains, is spread almost entirely from person to person just as scarlet fever is. Unfortunately a person may carry the germ in his throat, even though he is not actually ill with diphtheria, and so pass it on to someone else. The part that bad drains and sanitary conditions play is to predispose to sore throats and a general lowering of the body vitality, and thus help to produce a favourable condition of the body or " soil " for the development of the diphtheria germs. *Measles* is so infectious that it is very difficult to prevent the spread of infection from one child to another in the home or school, even more difficult than to prevent the spread of a common cold; indeed, measles begins with a condition very similar to a common cold. Measles is a more serious disease than is commonly supposed and requires careful nursing. Everything possible should be done to postpone the infection until after infancy, for in infancy complications may be extremely serious.

In the prevention of infection the individual and the community have important parts to play. Some diseases are notifiable, that is, the Medical Officer of Health for the district must be informed of their occurrence and the patients must be " isolated " either in the home or in a fever hospital, and thus prevented from spreading the disease by infecting others. In addition, the Medical Officer of Health will, when he considers it necessary, provide facilities for the disinfection of infected rooms or articles, although, as already shown, this is not so important as was formerly believed. Disinfection is carried out by the application of steam or of certain chemicals which are harmful to germs.

The individual has, however, a greater responsibility. He or she, while suffering from even a mild attack of any infectious disease or having possibly been infected, must avoid mixing with other people and should refrain from travelling or resorting to places where the ventilation may be imperfect. Spitting in public, coughing or sneezing without holding a handkerchief to the mouth—these are practices to be condemned for they spread droplet infections.

5. Resistance of the Body

It has already been noted that disease can follow only if a dose sufficiently large to break down the body resistance is received. The germs which cause pneumonia are almost constantly to be found in our throats, but they do not cause disease unless our resistance is low or is temporarily lowered as for example, by a chill. Even a large amount of seed in the form of germs may not be able to grow if the soil is unsuitable, while a small amount may produce disease if the soil is favourable. How can the soil, that is the body, be made more resistant, or in other words, how can we obtain immunity, relative or absolute, from these diseases?

A person who leads a healthy life is more resistant to disease than one who does not. Fresh air, sunlight, exercise, adequate rest, proper and sufficient food, elimination of waste matters—these all help to raise the resistance of the body to the invading germs. Immunity or protection can be artificially obtained in respect of some diseases such as smallpox and diphtheria. This immunity depends on the formation in the body of certain substances which render the soil unsuitable for the growth and multiplication of the germs causing these diseases. This result may be compared with the immunity which follows an attack of one of the common diseases. For example, it is unusual for anyone to have measles more than once. One attack causes the body to produce certain substances which usually remain in the system throughout life, rendering that body an unsuitable soil for the development of the germ which causes measles. The successful prevention of many infectious diseases depends on our finding out how the body may be stimulated, without an attack of the disease, to produce such substances, but at present we know of a few diseases only which can be controlled in this way.

6. Some of the Commoner Infectious Diseases

Measles is contracted from another person suffering from the disease, possibly at a time before the other person knows he is ill. We have not been able to identify the germ responsible for the disease, but it appears to have a very short life outside the human body. The incubation period (i.e. the

period elapsing between the date of infection and the manifestation of the disease) of measles is about twelve days, at the end of which time the patient shows symptoms very similar to those of a severe cold. As the rash does not appear until about four days later, the significance of these symptoms may not be recognised, and it is during this period that the disease is most infectious. Measles is responsible for a great many deaths, particularly of children under school age, each year, mainly through complications such as pneumonia. We must, therefore, welcome the success of any methods designed to postpone an attack of the disease.

Whooping Cough is another serious infectious disease which kills almost as many children as measles, and at about the same age as measles (under five). It is spread from child to child. The incubation period is probably about a fortnight, but this is difficult to determine as the disease usually begins in an indefinite manner and for some time the patient is suspected of having nothing worse than an ordinary cough. The termination of the disease is even more difficult to determine and children often whoop for weeks after they have ceased to be infectious.

There are other, and happily rarer, infectious diseases equally difficult to control, such as *cerebro-spinal fever* and *poliomyelitis*. They are spread from person to person, probably by means of " droplet infection " from the mouth or nose (by breathing, coughing, shouting, kissing, etc.), being conveyed generally by healthy " carriers " not actually suffering from the disease.

Scarlet Fever and *Diphtheria* may be considered together, since, although diphtheria is a dangerous disease, while scarlet fever has for many years in this country been much less harmful and death from it infrequent, they have nevertheless many points in common. The incubation period of both diseases is short, sore throat is a prominent symptom, and both diseases can be spread by " carriers." These are persons who, without showing any symptoms of either scarlet fever or diphtheria, carry in the throat, nose or ear the germs of these diseases, and as a result of so doing are capable of infecting other people. The existence of such " carriers " in a school or community may be unsuspected for some time, and they may be difficult to detect. Protection against both scarlet fever and diphtheria can be obtained by artificial immunity. A skin test (Schick test) can be applied to show whether a child or person has acquired immunity to diphtheria, and if he has not, active artificial immunity can be given by a course of injections with diphtheria prophylactic. A

similar method is available against scarlet fever, but it is much less reliable.

It used to be believed that an attack of scarlet fever always produced a rash. It is now known that illnesses, comparable in every way to scarlet fever except for the absence of a rash, can be communicated to others and produce results precisely similar to those occurring during or after typical scarlet fever. A sore throat is generally the most obvious feature of these attacks, and therefore all children with sore throats should be excluded from school when scarlet fever is prevalent, owing to the possibility that they may be suffering from the modified type of the disease which has no rash.

Enteric or Typhoid Fever is now a comparatively rare disease in communities in which a reasonable degree of personal cleanliness is observed, because the germ is conveyed not in the breath of a patient, as in measles, whooping cough, diphtheria and scarlet fever, but in the discharges from the bowel and the urine, and sanitary conditions are now such that in most populous communities these products are disposed of in a hygienic manner. The disease, however, is of interest in that at one time it was so common that when people spoke of "the fever" it was usually typhoid fever which was meant. Obviously where insanitary conditions prevailed fever of this kind was common, and even now the old idea persists in many minds that " fever " is mainly due to bad drains and similar conditions. This is true only if diseases of the typhoid group are meant; it does not apply to such diseases as scarlet fever, diphtheria or measles.

7. The Fight against Tuberculosis

The tubercle bacillus.—It is possible to interest children keenly, without engendering any morbid feelings, in the great fight against tuberculosis, the White Man's plague. They may learn how widely present in Nature is the tubercle bacillus, how it gains entrance into the body through the mouth or nose, in the case of children through drinking infected milk or putting dirty objects picked up off the floor into the mouth, or by breathing in particles of dust which have been infected by germs coming from a consumptive person. They may learn how important it is to keep their bodies healthy in every possible way in order to resist the development of any germs taken in, and to keep themselves and their surroundings clean.

The children will be interested to hear that the germs of tuberculosis are, like other *microbes*, so minute that they cannot be seen with the naked eye; they can be seen only through a microscope. When magnified many times by this means they are seen to be like little rods (hence the

name *bacillus*), rather similar to a match cut into many pieces, but so small that thousands placed end to end would only measure an inch in length.

The tuberculosis germ may attack any part of the body, but most commonly the lungs (producing what is sometimes called " consumption "), and, in children, the brain, various glands and the bowel. Hence the importance of the precautions referred to above. Other parts of the body that may be attacked by the germs are the bones (arms, legs, ribs and spine), the joints (knee, elbow, hip) and the skin. We are all liable to attack by germs, but fortunately we have in our bodies a power of defence against the enemy. If we are in good health we may be successful in this defence, and we call this having good resistance. If we are in poor health (and poor resistance) we may lose the battle. Our resisting power is kept fully up to its work by our leading healthy lives, eating nutritious foods, taking sufficient exercise in the open air, having enough sleep, and avoiding over-strain, worry and excess of various kinds. Thus it is seen that though we may inhale a few tuberculosis germs they will do little harm unless our bodies have lost their resisting powers; but what it is most important to guard against is a " large dose " (known to the doctors as " mass infection ") of the germ, through sleeping in the same bed or room as a consumptive person, or in other ways coming into close contact with tuberculous persons in confined spaces. There is then a danger of so many germs entering our bodies that our power of defence is overcome.

Preventive measures.—There are many weapons that we can use, in addition to keeping the body up to its full resisting strength, to fight tuberculosis infection and prevent both ourselves and others from getting the disease. The most valuable of these weapons is knowledge. The germs of tuberculosis can live in dust for months, in dark and dirty places, especially in houses; but the germs soon die if exposed to sunshine, or they can be killed by burning, boiling or suitable disinfectants. If a pure and tubercle-free milk supply is not available, it is best to boil or pasteurise the milk.

Thus, in addition to nourishing food and fresh air and sunshine, good habits and a clean environment are our chief allies. When you cough screen the mouth with a handkerchief, or, failing that, with your hand. Tuberculosis germs may be present in the spit or phlegm, so do not spit. In any case, it is a dirty and objectionable habit. To sum up, the chief and primary means of preventing tuberculosis are fresh air and cleanliness of the hands and body and of our houses.

Tuberculosis among children occurs in rather special forms in that non-pulmonary infection is more common than infection of the lung. For instance, tuberculous meningitis (tubercle of the membranes of the brain) is responsible for more than 50 per cent. of the mortality from tuberculosis of all forms during the first ten years of life, as compared with less than 15 per cent. of pulmonary tuberculosis and some 10 per cent. of intestinal and abdominal tuberculosis in the same age period. Happily there is a steady and substantial decline taking place in all forms of child tuberculosis and particularly in its non-pulmonary forms, which however are responsible for most of the mortality from this disease in the first ten years of life. After ten years of age the pulmonary form tends to increase. Tuberculosis in children may be due to the bovine or to the human type of the tubercle bacillus, though the latter predominates. The bovine tubercle bacillus gains access to the child's body in tuberculous milk, the human by infected air. In recent years much has been done to protect children from infection, and if attacked to treat them in sanatoria.*

8. How to Avoid Communicable Skin Diseases

As regards such communicable diseases as pediculosis, impetigo and ringworm children should be taught to take pride in their personal appearance. On no account must they fall below the standard of a clean head and a clean skin; as one child always catches pediculosis from another they should learn to feel that it is bad form to be the means of making another child dirty.

Children should not be accused of being dirty because they have developed ringworm which may appear in the head or body of the cleanest child. They should, however, learn that, as it always spreads directly through contact of head with head or through the exchange of hats and caps, the risk of infection may be at once stopped. Children should be taught, as far as practicable, to use their own hair brushes only and not to exchange caps or clothes with other children.

In order to avoid contracting infectious or contagious disease by the skin two rules should be followed. First, the skin itself should be kept clean and healthy, by cleansing and by muscular exercise. Secondly, actual contact with disease should be avoided. For instance, smallpox, scarlet fever, measles, ringworm, pediculosis, and certain eye diseases may be "caught" by contact, and many other infectious diseases by close association.†

* Much additional information on the subject of *Tuberculosis* may be found in Public Health and Medical Subjects Report, No. 64, issued by the Ministry of Health, 1932 (H.M. Stationery Office) (Out of print).

† *See* also Memorandum on Closure of and Exclusion from School, 1927 (H.M. Stationery Office) (Out of print).

APPENDIX

This Table was drawn up primarily for use in Public and Preparatory Schools, which are, in the main, boarding schools. It contains, therefore, some directions as to quarantine which are not applicable in the case of certain diseases in Elementary Schools.

Thus, in the case of mumps, the Joint Memorandum on Closure and Exclusion, issued by the Ministry of Health and the Board of Education, recommends that exclusion may, as a rule, be confined to the patient himself and need not be applied to children who have been in contact with him.

Table of Incubation, Quarantine and Isolation*

Disease.	*Incubation.*	*Quarantine.*	*Isolation of the Infected Person.*
Diphtheria	2–10 days	All exposed persons until shown by bacteriological examination not to be carriers.	In no case for less than four weeks or until convalescence is complete.
Epidemic Parotitis (Mumps).	14–28 days	30 days	For not less than two weeks from the commencement—provided that one clear week has elapsed since the complete subsidence of all swelling.
Morbilli (Measles)	7–14 days	16 days	For not less than ten days from the date of the appearance of the rash, convalescence being satisfactorily established.
Rubella (German Measles)	9–19 days	21 days	For not less than seven days from the date of the appearance of the rash, provided there is no persistence of nasal or other symptoms.
Pertussis (Whooping Cough)	7–19 days	21 days	Until the characteristic spasmodic cough and the whooping have ceased for at least two weeks; or in cases of persistent whooping, for not less than four weeks from the onset of the spasmodic cough.
Scarlet Fever	1–8 days	10 days	For not less than four weeks from the date of the appearance of the rash, until convalescence is completed, and there is no sore throat, DISCHARGE FROM THE EAR OR NOSE, any suppurating or recently enlarged glands, or exzematous patches. In every case at least two weeks convalescence is advised before return to school.

*Reproduced from "*A Code of Rules for the Prevention of Communicable Diseases in Schools*," issued by the Medical Officers of Schools Association (Messrs. J. & A. Churchill, 104, Gloucester Place, Portman Square, W.1), 1928, price 2s. 6d.

APPENDIX—*continued*

Disease.	*Incubation.*	*Quarantine.*	*Isolation of the Infected Person.*
The Enteric Group ...	3–23 days	25 days ...	Until convalescence is definitely established.
Varicella (Chickenpox)	11–19 days	21 days ...	Until every primary scab has fallen off, and the skin lesions have healed, particular attention being paid to the Scalp.
Variola (Smallpox) ...	10–14 days	16 days ...	Until every scab has fallen off and the skin lesions have all healed.

As a general rule an attack of the above infections confers a lasting immunity.

Contagious diseases of the skin. Impetigo and Tinea (Ringworm of the Scalp or Body).	Until all the lesions have healed.

The Incubation is difficult to determine in the following diseases, but the periods given have been obtained from the latest available evidence.

Disease.	*Incubation.*
Cerebro-Spinal Fever	1–10 days, most cases 2–5 days.
Poliomyelitis (acute) and Polio-Encephalitis	2–10 days, usually 3–4 days.
Encephalitis Lethargica	Varies considerably, but two days to two weeks includes most cases. (Commonest 10 days.)

Epidemic Jaundice.—Under certain circumstances which are not as yet definitely known Jaundice may assume an epidemic form and special precautions may be necessary to deal with this eventuality.

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